JULY 27, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Jim Carey: Symbol Of Troubled Labor

The president of the International Union of Electrical Workers was one of the first leaders of the big industrial unions to run into new management attitudes and techniques in labor bargaining. A four-part series on labor's reactions and probable moves to counter the new ground rules begins on Page 71.

Losses Mount and Spread as Steel Strike Heads into Its Third Week

Steelmakers to Buy More Equipment

How Managers Rank Their Problems

Inflatable Tubing: What It Offers

Attachment 'Caresses' Surfaces to Give a Controlled Fine Finish

What's Ahead in Space Needs

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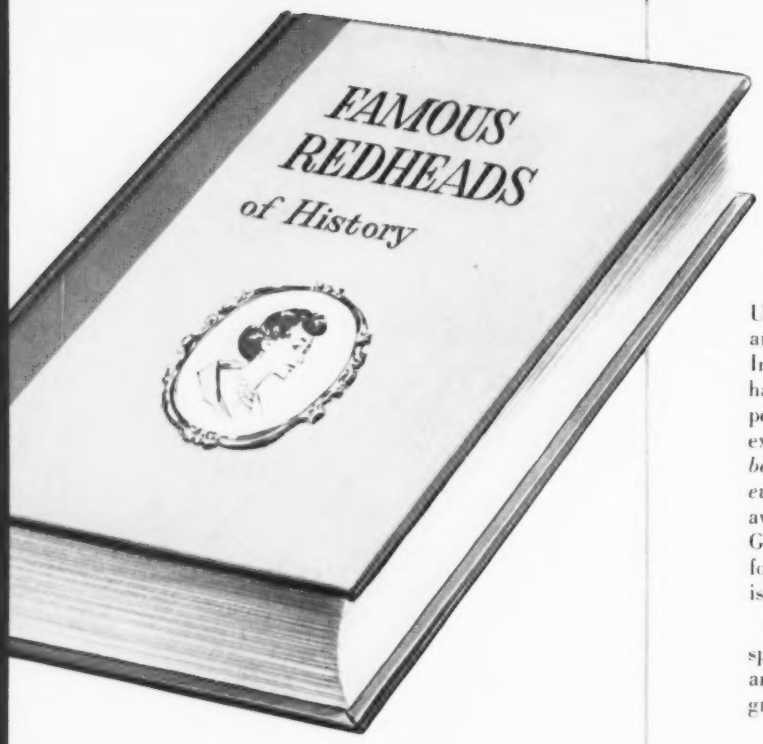


in the past...

Throughout the ages, redheads have acquired a reputation for being glamorous, adventurous, unpredictable and often temperamental—greatly admired or greatly envied. Cleopatra, Queen Elizabeth, Madame Pompadour, Mary Queen of Scots, Lady Hamilton, Nell Gwynn, Madame Dubarry, Sarah Bernhardt—some of history's most tempestuous titian-haired beauties undoubtedly contributed to this fame.

In literature, too, redheads have often been cast in similar roles—like Nana, Sadie Thompson, Becky Sharpe and Scarlett O'Hara, to mention just a few.

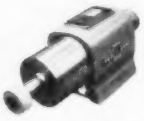
The relationship between hair coloring and personality may have been sheer coincidence. But the fact remains that redheads usually stand out from the crowd in more than appearance alone.

RED HEAD
HEALD

in the present...

Unlike their feminine counterparts, Heald Red Heads are *not* temperamental and definitely *not* unpredictable. In fact Heald Red Head boringheads and wheelheads have achieved an enviable reputation for dependable performance, based on more than 30 years of operating experience. And today, the Red Head line includes *six basic types*, in sizes, speeds and capacities for virtually *every* metal-working application. Heald Red Heads are available not only for Heald Bore-Matics and Internal Grinders, but also (and many people do not realize this) for use with any similar types or makes of precision finishing machines.

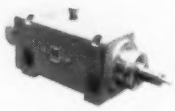
From this complete Red Head line you can select a spindle unit that will help you improve product quality and cut production costs on any boring or internal grinding job.



RED HEAD BELT-DRIVEN WHEELHEADS
Cool-running, permanently lubricated wheelheads for standard belt drive. Sleeve Style, Naked Style and Quill Style heads for speeds up to 40,000 rpm.

RED HEAD HI-FREQUENCY WHEELHEADS
Permanently lubricated or mist lubricated precision wheelheads for Hi-Frequency drive. Naked Style, Quill Style or for mounted point wheels. Speeds up to 100,000 rpm.

RED HEAD HI-SPEED BELT DRIVEN WHEELHEADS
New head design permits small hole grinding at speeds from 45,000 to 100,000 rpm without the need for high frequency generating equipment.



RED HEAD BORINGHEADS
Permanently-lubricated belt-driven boringheads for high-precision Borizing with rotating tools or rotating work. Speeds to 8,000 rpm.; available in a wide range of sizes.

RED HEAD MULTI-SPINDLE BORINGHEADS
Permit simultaneous multiple-hole Borizing with centers as close as ¾". Miniature Precision Red Heads, with common belt drive, mounted in interchangeable precision-bored spindle plates.

RED HEAD BORIZERS
Completely self-contained motor driven, hydraulically powered head units for rotating, feeding and retracting single or multiple tools in automated setups.

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Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

This Week in STEEL

The Metalworking Weekly

July 27, 1959 Vol. 145—No.4

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Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED JULY 18	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	139†	162	174	133

†Preliminary.

In the latest period, STEEL's index reflects the start of the steel strike. The loss of 23 points is only the beginning of the decline which could drop the index to a point between 80 and 100.

Details on Page 91

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED JULY 25	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	120,000*	126,848†	127,217	85,519

*Estimated. †Preliminary.

Chrysler Corp. is the only automaker so far to start model changeover cutbacks. Studebaker-Packard Corp. is expected to shut down this week. The rest of the industry will go full throttle until well into August.

Details on Page 88

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED JULY 26	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	382*	1,097	2,486	1,546
Index (1947-49=100)	23.8*	68.3	154.8	96.2
Percentage of capacity	13.5*	38.7	87.8	57.3

*Estimated by STEEL; comparative figures reported by AISI.

Strikers forced a drop in steel production to the lowest level since the five week steel strike in mid-1956. The situation won't change greatly until an agreement is reached; additional mills will close July 31 as their contracts expire.

Details on Page 152

STEEL SCRAP PRICE COMPOSITE

	JULY 22	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh	$38.67	$38.67	$36.50	$37.67

Scrap prices remain firm in the face of curtailed consumption. Stocks held by collectors are comparatively small and continue in strong demand for export.

Details on Page 164

FINISHED STEEL PRICE INDEX

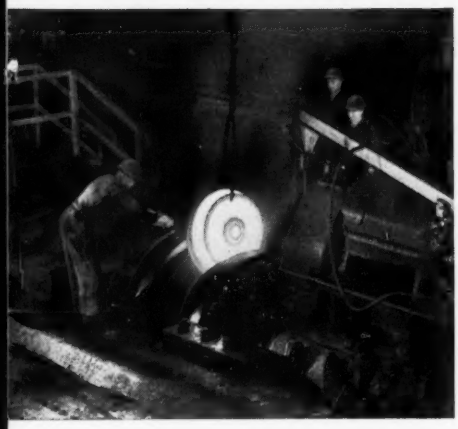
	JULY 21	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.7	186.7	186.7	181.5

The spread between quotations on foreign produced steel items and those on domestic material is narrowing. Importers are taking advantage of the stringency in supplies by revising their prices upward.

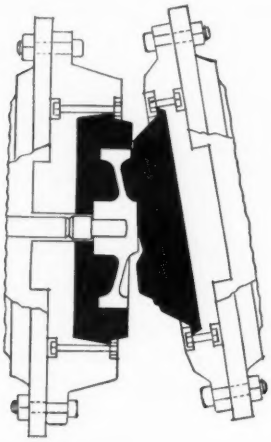
Details on Page 153

Unique Mill Forges and Rolls circular products in one operation

In less than one minute, this Bethlehem mill—the only one of its kind in the country —turns out a top-quality impression-die steel forging at a cost that's hard to match.



This is Bethlehem's famed circular-products mill—the Slick Mill. Named for its designer, Edwin E. Slick, this unique machine produces impression-die circular forgings ranging from 10 in. to 46 in. OD; as-rolled weights ranging from 100 to 2,000 lb. It handles almost any grade of steel—carbon, alloy or stainless, as well as certain heat-resistant grades.

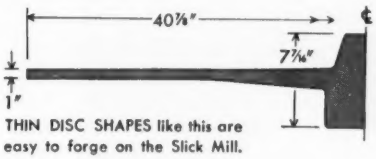


How It Works

Designed to operate in a horizontal plane, Bethlehem's Slick Mill is constructed with two *revolvable* spindles on which face plates are mounted. These face plates support the impression dies that form the steel billet into shape by a combination press and rolling action.

After the steel billet is heated and descaled, it is centered between the dies of the Slick Mill. Then a 1500-ton hydraulic ram actuates the spindle on the straight side of the mill, upset forging the billet. When this cycle is completed, a 2,000-hp motor actuates the spindle on the angle side of the mill and the rolling cycle begins. By continuing the upsetting action and rotation of the dies and work, the material flows into the recesses of the dies, resulting in the desired shape. *The entire rolling cycle takes about one minute.*

After rolling, excess material in the form of flash is sheared off; the hub, when necessary, is punched; and the forging is inspected.



THIN DISC SHAPES like this are easy to forge on the Slick Mill.

Cost-Saving Features

Quick operation: Only one minute is needed to convert a heated slug into a contoured forging, whether the product weighs 100 or 2,000 lb.

Quick die changes: Only 15 minutes are needed to change and set up dies. Even production runs as small as 25 or 50 pieces are economical.

Low die charges: Since contact time between die and work is very brief, and because there is no impacting, low-cost die blocks can be used. In many cases, die charges are ⅓ to ½ less than conventional impression dies.

Less steel needed: Utilizing the principle of forging design, the Slick Mill can produce lighter-weight sections without sacrificing strength.

Good physical characteristics: The process insures excellent grain flow, machinability and soundness.

Bethlehem's Slick Mill is readily adapted to jobbing or production quantities of forged circular products such as: gear blanks, fly wheels; crane track wheels; sheave wheels; brake drums; clutch discs; couplings; tire moulds; and turbine or compressor wheels. Products may be specified as-rolled or rough machined to specifications.

Your inquiry—whatever the quantity involved—will receive prompt attention. Call or write the Bethlehem sales office nearest you today.

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BETHLEHEM STEEL

BETHLEHEM STEEL

COL. A. E. R. PETERKA, *Manager of Aircraft Sales, Lamson & Sessions, tells why...*

"Flying fasteners" keep our sights high

AT Lamson & Sessions, we're producing many types of special "astronautics fasteners"—for use in aircraft, engines, missiles, space satellites. This fact has important meaning to you, as a fastener buyer, whether or not you use these high-precision specialties. Here's why:

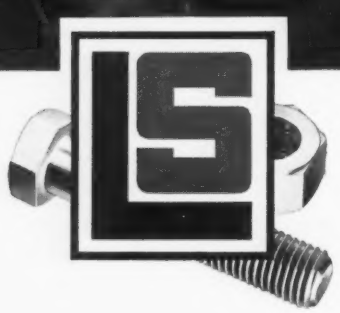
Engineering, inspection procedures, precision equipment at Lamson are geared to meet strict military and aircraft specifications, where required. Since we're set up this way, many of the same procedures and quality controls are applied to our production of commercial fasteners. This means you can expect, and get, superior quality and precision from Lamson.

New quality standards are being set in astronautics fasteners... to meet the grueling demands of supersonic speeds, severe "blast-off" stresses, higher operating temperatures. Just as automotive requirements raised Lamson's quality levels far above the wagon-buggy-and-plow days of 40 or more years ago—so have astronautics imposed a new set of standards. These permeate everything we do. And *all* our customers benefit!

Take advantage of the specialized engineering know-how and high quality standards available through Lamson... wherever you need fasteners for critical assemblies.

L & S Fastener Engineering helps you "tighten up" on...

- **PURCHASING COSTS**
- **INSPECTION AND HANDLING COSTS**
- **ASSEMBLY COSTS**



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Recently Eimco installed a 100 kw, 10,000 cycle TOCCO machine for heat treating track links. This equipment assures a completely uniform hardness pattern—the same every time for one link or one million. Furthermore, the parts are drawn as well as hardened by one TOCCO machine with one operator.

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In addition to superior quality, TOCCO increased track link production over 400%. Formerly, one man could produce 35 links per hour; now, with TOCCO, he produces 150!

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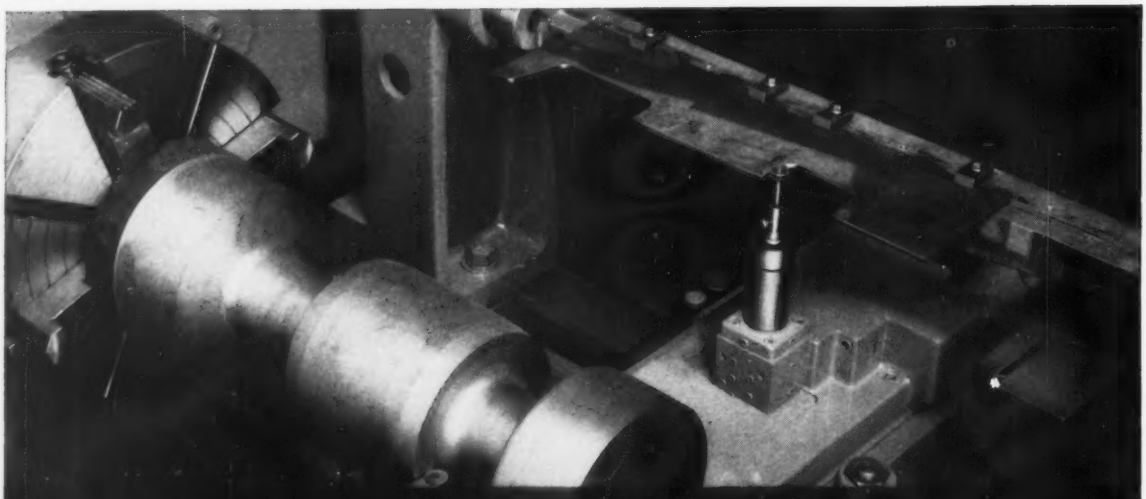
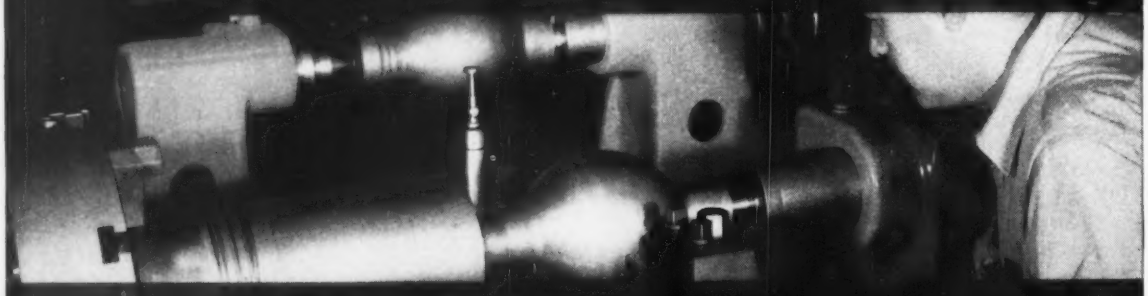


trace from flat or round templates



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July 27, 1959

Firebird III in Transit

The fellow on the right is the best guesstimator in STEEL's first Beat-the-Experts contest. He's Charles F. Jacobs, manager of sales services, Shakeproof Div., Illinois Tool Works, Elgin, Ill. Editor Walt Campbell presented Reader Jacobs the sleek 24 in. model of General Motors' Firebird III during STEEL's Metalworking Marketing Workshop at Chicago.

Winner Jacobs' entry in the contest was a mere 296 over the U. S. passenger car production figure, 3,284,037, which was tabulated by *Ward's Automotive Reports* for the January-June period this year.

Incidentally, an expert beat the experts. Winner Jacobs is responsible for making forecasts of automobile production for his company.

There were two winners from the Shakeproof Div. of Illinois Tool. Minor Gouverneur, chief product engineer, placed seventh.

No Coals to Newcastle

The race for the ten runner-up positions had the editors holding their breaths. For awhile it looked like we'd be presenting the Firebird model to a GM staffer. The number one runner-up was S. J. Stanaway, an engineer on GM's Engineering Staff, at the company's Technical Center at Detroit. His estimate, 925 more than *Ward's* figure, brought him a full color print of the dream car rendered for the contest by George W. Walker, Ford vice president and director of styling.

How the Field Finished

The other dream car print winners made entries which placed them within 5598 cars of the amount totted up by *Ward's*.

Here's how they crossed under the wire:

Joseph J. Boler, machine shop supervisor, Kalamazoo Mfg. Co., Kalamazoo, Mich. (off 1037); James E. Bateman, president, Spiral Brushes Inc., Cleveland (off 2108); R. M. Hastings Jr., senior manufacturing engineer, General Electric Co., Schenectady, N. Y. (off 2273); Charles G. Purnell, manager market development, Jessop Steel Co., Washington, Pa. (off 2306); Minor Gouverneur (off 2727); Lee E. Darley, works manager, Texlite Inc., Dallas (off 4037); Thomas D. Colacchio, draftsman, Niforge Corp., Boston (off 4519); Carl C. Voelker, general foreman, Hydraulic Research & Mfg. Co., Burbank, Calif. (off 5487); and F. W. Frohn, purchasing agent, Bristol Co., Waterbury, Conn. (off 5598).

Consolation for the Losers

Our congratulations to the winners, and to the 1670 losers, chins up. If you entered the second contest, which covers production for the full year, you still have a chance to enter the winner's circle. The second contest has been closed. Results will be announced in January, 1960.

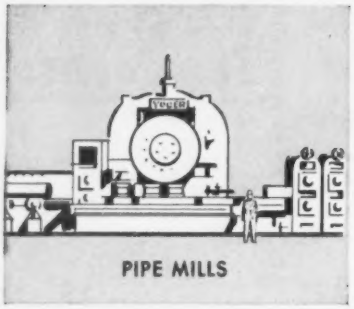
Maintaining Employee Relations

Assorted "ooohhhs" and "aaahhhs" greeted Detroit Editor Don Postma's unveiling of the dream car print at a STEEL staff meeting earlier this year. To keep the peace, and to quell the clamorous requests for copies of the print, Editor Campbell opened a private contest for staff members.

Entries were accepted on the spot. Our winner of a dream car print is Bob Jaynes, the editor who gives you a weekly look at the economic weather in his Business Trend column.

Smiling Bob was several thousand off the mark. He comments, however: "I didn't have a chance to check my projections of car production—we had to give our estimates without leaving the meeting."

So much for memory, Bob. We're glad our business expert won and that white-framed color



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Today's expanding markets and tightening economy demand closer production cost control. YODER'S complete line of ferrous or non-ferrous Pipe and Tube mills can help you meet production schedules economically... help you realize significant savings in the manufacture of tube and pipe.

YODER Pipe and Tube mills offer flexible production to meet fluctuating demand. They adapt easily to the most rigorous schedules. Everyday manufacture of constant high quality pipe and tube in diameter of 5/16" to 24". Speeds up to 350 fpm plus can be obtained with YODER mills.

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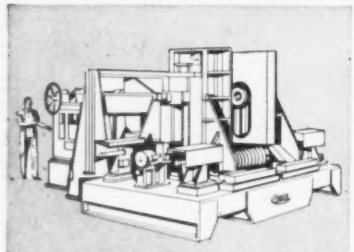

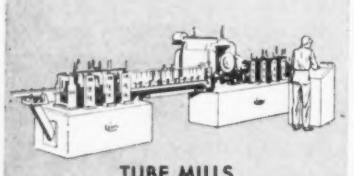

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PIPE AND TUBE MILLS
(ferrous or non-ferrous)

print looks right handsome on your office wall.

Idea Sparker

E. R. Lind, manager, office standards and methods, Joseph T. Ryerson & Son Inc., Chicago, serves up a bouquet for the Program for Management series:

"It's remarkable that a journal can provide such down to earth material. You are performing a real service. When the series has been completed the combined material would be a useful manual to many of us. Perhaps you could think along these lines."

In the past we prepared the series in booklet form, but there were so many requests for single articles that we sometimes ran short of reprints. Each article is now available in folder form which is convenient for loose leaf binding. If you'd like to have the entire series, just drop us a note. You'll automatically get a copy after each article is published.

How Was That Again?

Ever alert for accuracy, sharp eyed District Editor Erle Ross spotted a dandy boner in one of Chicago's outstanding newspapers. In it, a writer recounted Queen Elizabeth's cruise along our fourth seacoast and mentioned her majesty's plane trip to Knob Lake, 350 miles north of the Quebec-Labrador border. "There," the writer continued, "the Queen and Prince Philip visited one of the open cast iron mines . . ."

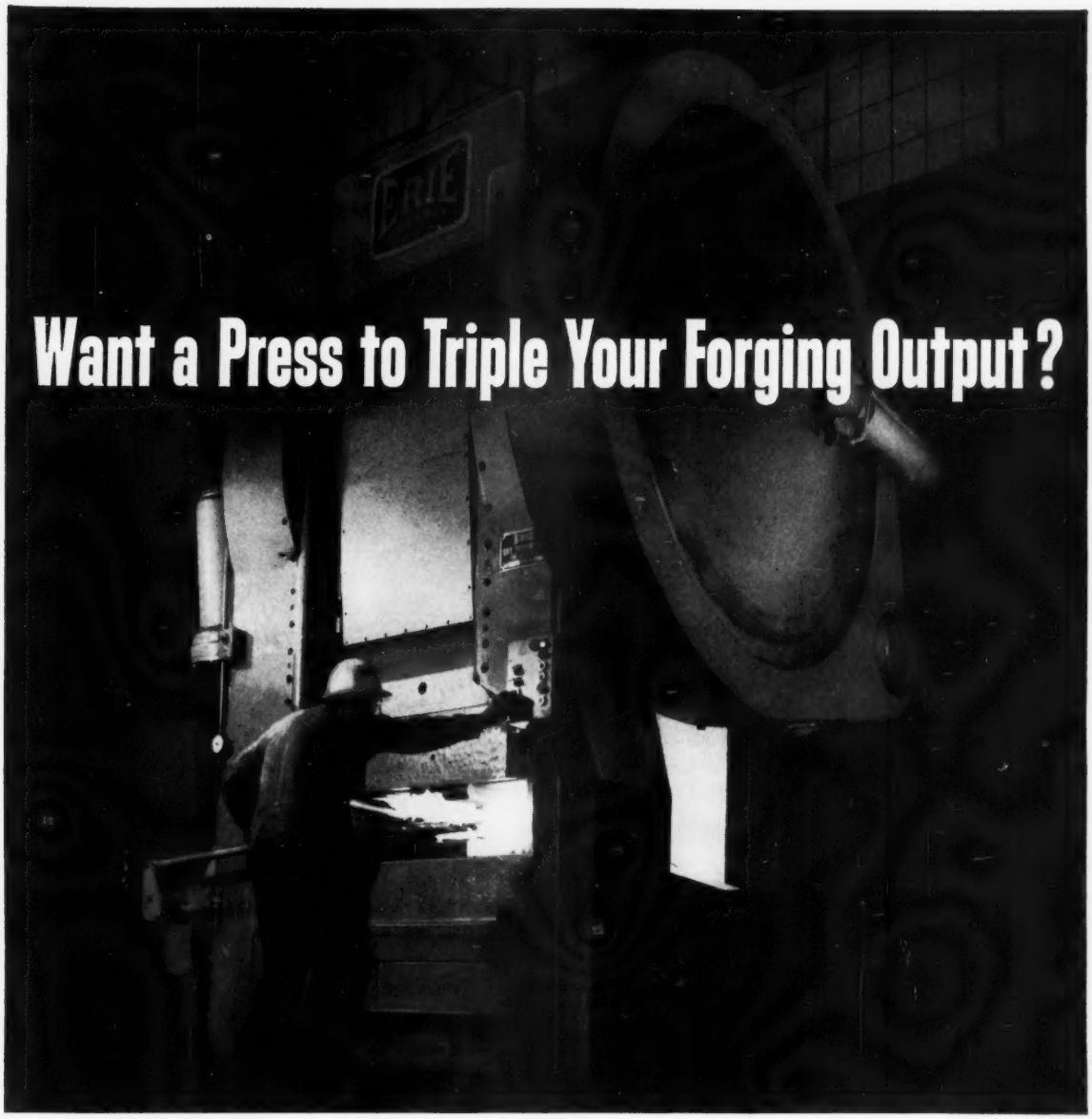
That one's in the category of the inquiry received by the U. S. Bureau of Mines which requested a list of all the brass mines in the world.

How Do You Stack Up?

Ever wonder how your inventory compares with the rest in your industry? In May, 1952, STEEL began a series which answers that question and helps you anticipate the trends of business in the coming quarter. Our quarterly surveys appear in January, February, April, May, July, August, October, and November.

You say that's eight "quarterly" surveys? You're right. Actually there are two series of surveys. One for metals and the other for components.

Next week, Assistant Editor Derry Eynon will present the results from a quarterly survey of metals buyers. No matter how you stack up, check this survey. The steel strike threat had more than a few effects on buying in the quarter just ended.



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Tell us your forging problems and give us your production specifications—we'll do the rest.

Erie Foundry, one of the first companies to automate forging, can provide specially designed *high volume* presses in capacities of 1000 to 8000 tons. Instead of the three machines and nine men formerly required, now you need only one Erie automated forging press and only one operator observer—to triple your present production rate! Trimming, too, can be accomplished in a single production cycle. With billet supply and finished part removal conveyorized, it is possible to achieve a production volume of, say, 1200 track-link forgings per hour.

Erie Foundry has a complete line of machines designed for high volume production of such parts as connecting rods, gear blanks, automotive and tractor valves, pinions, track links and wheel hubs.

We would like to discuss application of automated presses to your production requirements. For the complete story, phone or write Mr. R. E. Sanford, Erie Foundry Company, Erie 2, Pa.

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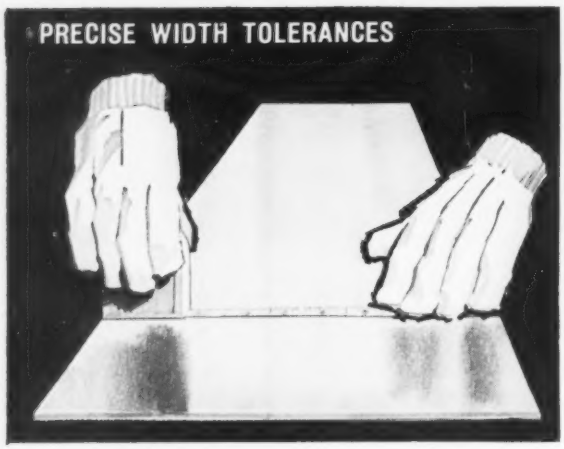
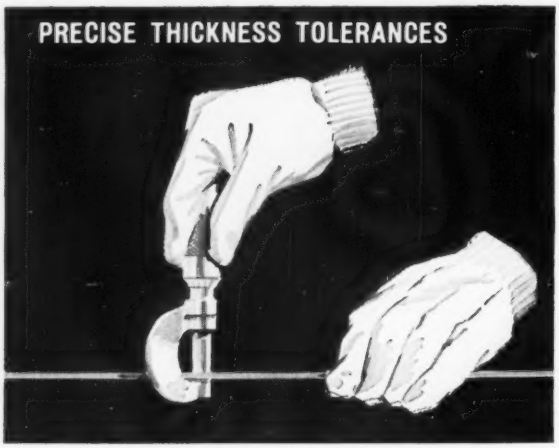
The finish you get on your Amerstrip order has been specially prepared to meet *your* product's needs.



If your fabricating machines require a special width strip that's just what you'll get with Amerstrip. USS Amerstrip can be produced in any width under 24 inches . . . well within exacting tolerance limits.

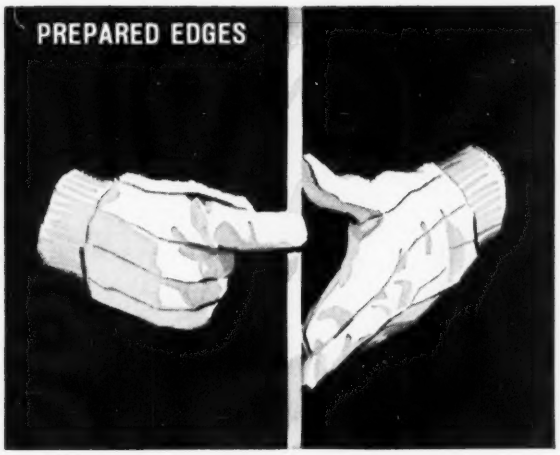


USS Amerstrip can be supplied in the thickness your machines demand. USS Amerstrip is fabricated on large production runs down to thickness tolerances as close as plus or minus .0005 inches.

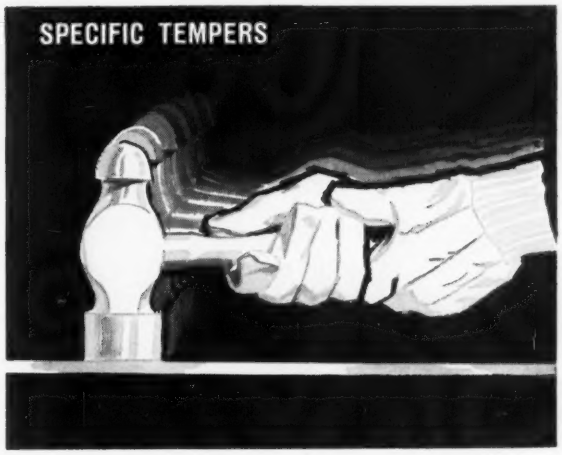
American Steel & Wire representatives are experts in the fabrication and application of USS Amerstrip Cold Rolled Strip. Whenever you have a need or problem involving cold roll let these experts show you how USS Amerstrip can do it better. Get in touch with our nearest representative or write to American Steel & Wire, Dept. 9173, 614 Superior Ave., N.W., Cleveland 13, Ohio.

USS and Amerstrip are registered trademarks

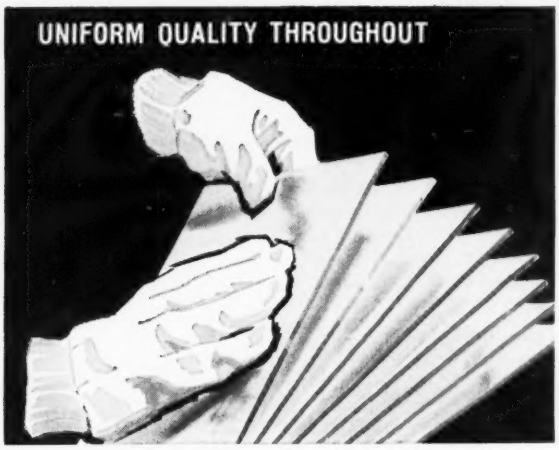
controlled" cold rolled strip steel



Because USS Amerstrip is produced in precision, order-size quantities, it can be supplied with the edge finish you need . . . square, standard, round, full round or bevel.



Whether your product must undergo a deep draw or other severe forming operation or require a special temper for rigidity, you'll get the exact temper you need when you order USS Amerstrip.



Whatever the size of your order . . . very large or very small, every coil of USS Amerstrip will be uniform in finish, in temper, in width and thickness. The use of USS Amerstrip will assure continuous production and high yields.

DESIGNED FOR END USE

This is really the sum total of all these other advantages. Because USS Amerstrip is "Quality-Controlled," because it is engineered to meet your needs, it assures you smoother, faster operation; a better, more salable finished product.

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WEBSTER

gal-va-nize (gal/və nīz/), *v.t.* 1. to simulate by or as by a galvanic current. 2. to coat (metal, esp. iron or steel) with zinc.

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CALENDAR
OF MEETINGS

July 29-Aug. 1, National Tool & Die Manufacturers Association: Summer board meeting, Grand Hotel, Mackinac Island, Mich. Association's address: 907 Public Square Bldg., Cleveland, Ohio. Executive vice president: George S. Eaton.

Aug. 9-12, American Society of Mechanical Engineers and American Institute of Chemical Engineers: National heat transfer conference and exhibit, University of Connecticut, Storrs, Conn. Information: Prof. David A. Fisher, Mech. Eng. Dept. U-37, University of Connecticut, Storrs, Conn.

Aug. 10-13, Society of Automotive Engineers: National west coast meeting, Hotel Georgia, Vancouver, B. C. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Aug. 18-21, Western Electronic Show and Convention: Cow Palace, San Francisco. Information: WESCON, 1435 S. La Cienega Blvd., Los Angeles 35, Calif.

Aug. 19-29, National Screw Machine Products Association: Sales conference, Wade Park Manor Hotel, Cleveland. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

Aug. 31-Sept. 2, Metallurgical Society of AIME: Institute of Metals Division's conference on semiconductors, Statler-Hilton Hotel, Boston, Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Sept. 13-17, Pressed Metal Institute: Annual meeting, Stanley Hotel, Estes Park, Colo. Institute's address: 3673 Lee Rd., Cleveland 20, Ohio. Managing director: Harold A. Daschner.

Sept. 13-18, American Chemical Society: Fall meeting. Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 14-17, American Mining Congress: Metal mining and industrial minerals convention, Denver. Congress' address: Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

Sept. 14-17, Society of Automotive Engineers: National farm, construction and industrial machinery meeting, production forum, and display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 16-17, American Die Casting Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

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Brown & Sharpe Model B Turret Drilling Machine...

DIGIMATIC† Model 202 Point-Positioning System

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drilling • tapping • boring • reaming

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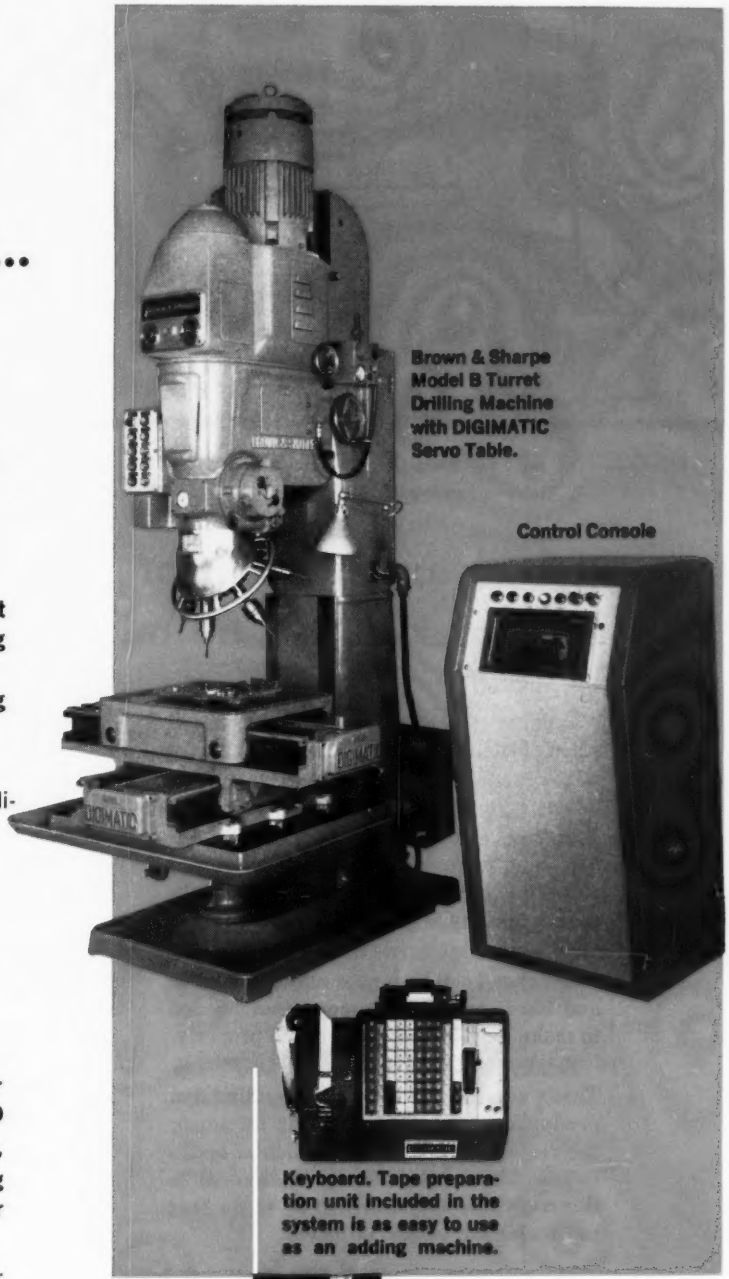

Brown & Sharpe Model B Turret Drilling Machine with DIGIMATIC Servo Table.

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Keyboard. Tape preparation unit included in the system is as easy to use as an adding machine.

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A DIVISION OF **GENERAL DYNAMICS**
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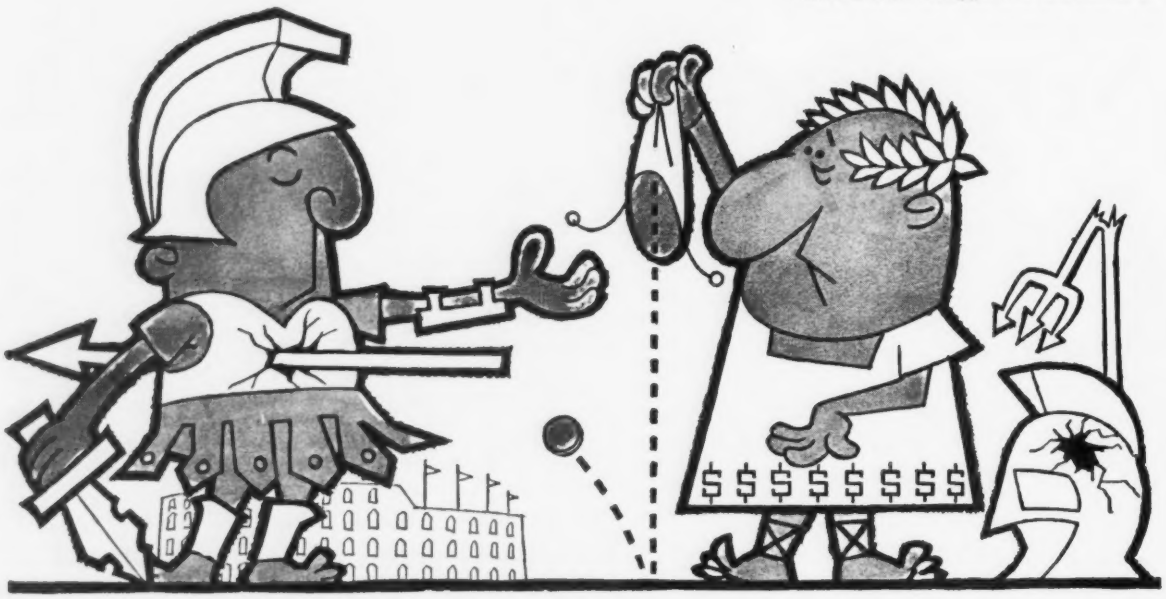
Man's Eternal Struggle with the Machine



WITH ALL THE COSTS OF DOING BUSINESS RISING STEADILY, PROFIT IS MORE ELUSIVE THAN EVER!

How long can the cost of "getting new equipment to work right" be buried in overhead?

No matter how attractive the original price of the equipment, it's false economy if the price tag *did not* itemize the extra money required to get it into production!

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A successful manufacturer of double-bowl kitchen sinks took that advantage. As a result, they replaced the previous high-reject, unprofitable method of fabrication with Sciaky resistance welding equipment. Within only ten days of installation, over 10,000 sink units were produced with less than a 1% scrap factor. Write for "Resistance Welding At Work", Volume 4-No. 6 for the details.

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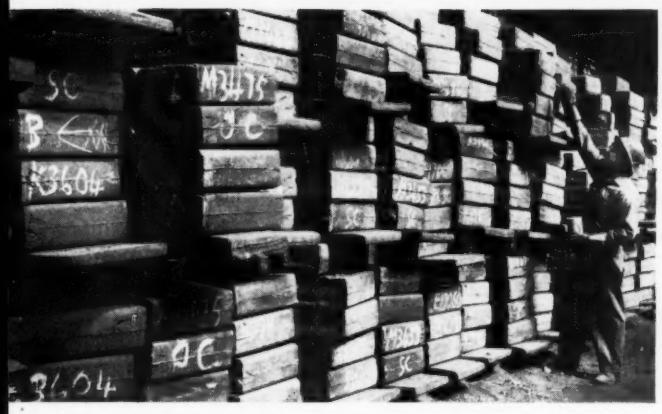

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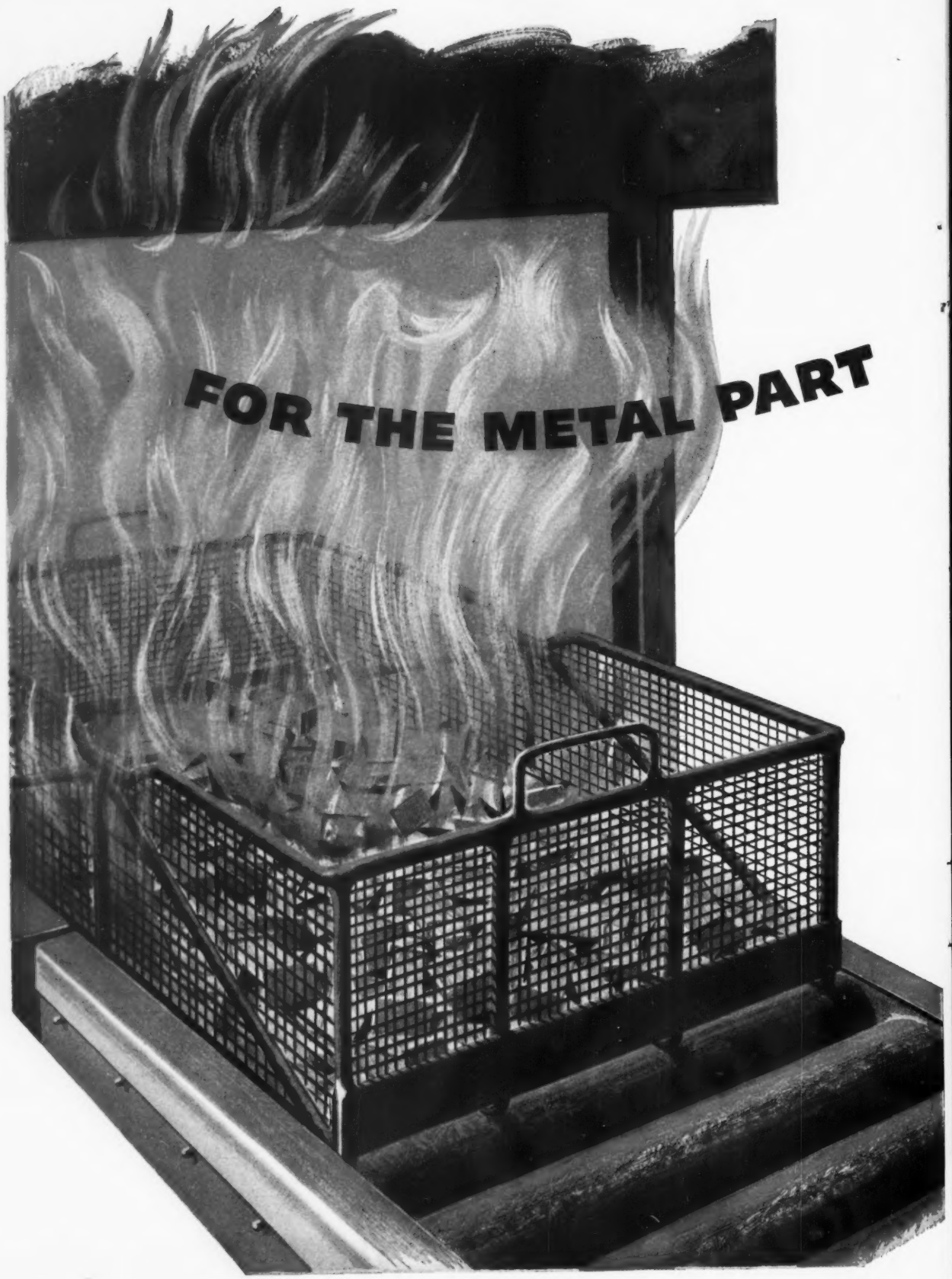
FOR THE METAL PART

THAT TAKES THE BEATING

Three years' operation at temperatures ranging from 1450 deg. F. to 2040 deg. F.! That's the record of a tray made of HASTELLOY alloy X, used for holding parts in a heat-treating furnace during hardening, gas carburizing, or gas carbonitriding. After the heat-treating cycle, parts are plunged into an oil quench—still in the tough tray.

If you are looking for a metal for machinery parts that have to withstand heat, corrosion, wear—investigate HAYNES alloys. There are more than 15 to choose from, including HAYNES STELLITE cobalt-base alloys, HAYNES iron-base alloys, HAYSTELLITE cast tungsten carbide, and HASTELLOY nickel-base alloys. They are available as castings, forgings, completely fabricated parts, or as sheet and bar stock. All parts can be furnished machined or ground to specified size and finish.

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HAYNES STELLITE COMPANY

Division of Union Carbide Corporation

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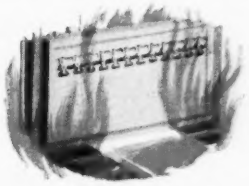
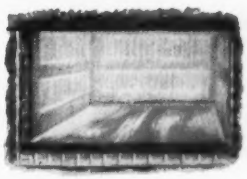
TYPICAL "HAYNES" ALLOY HEAT-RESISTANT PARTS

GRID TRAY of HASTELLOY alloy X holds bits during bonding of diamonds to drill bit face. Furnace heat is 2300 deg. F. in 1½-hour cycles. The trays withstand over 100 such cycles.



FURNACE DOOR HANGERS of HASTELLOY alloy X, exposed to 2000 deg. F. flames in either oxidizing or reducing atmospheres, have served over a year. Steel failed in three weeks.



HEARTH PLATES and hanger bolts of HASTELLOY alloy X are in their second year of service in electric furnaces that reach 1950 deg. F. – resisting oxidation, thermal shock, heavy loads.

"Samson" Shot (chilled iron)
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Guard your family!
Fight cancer with
a checkup and a check!

AMERICAN CANCER SOCIETY

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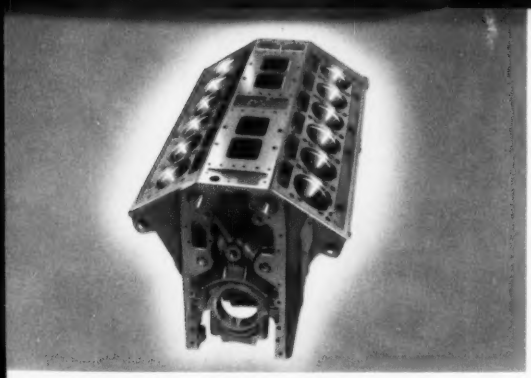
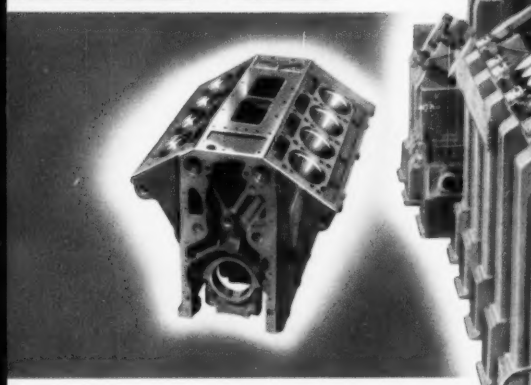
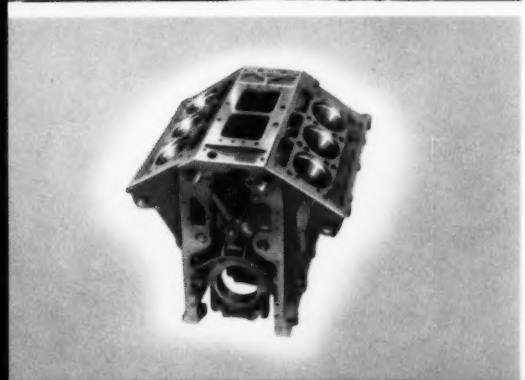


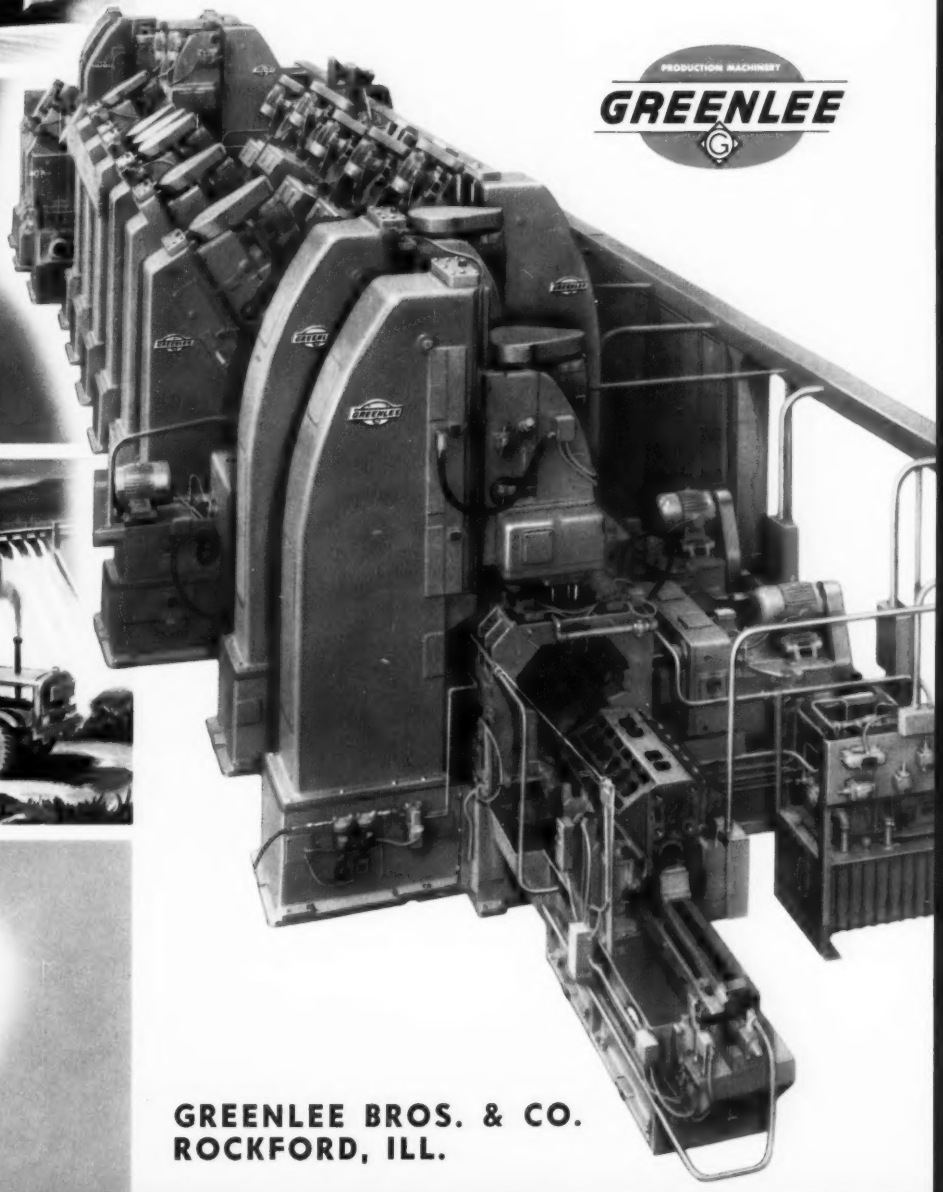




V-type Diesel engine blocks in three different sizes now processed on the same

GREENLEE TRANSFER MACHINES

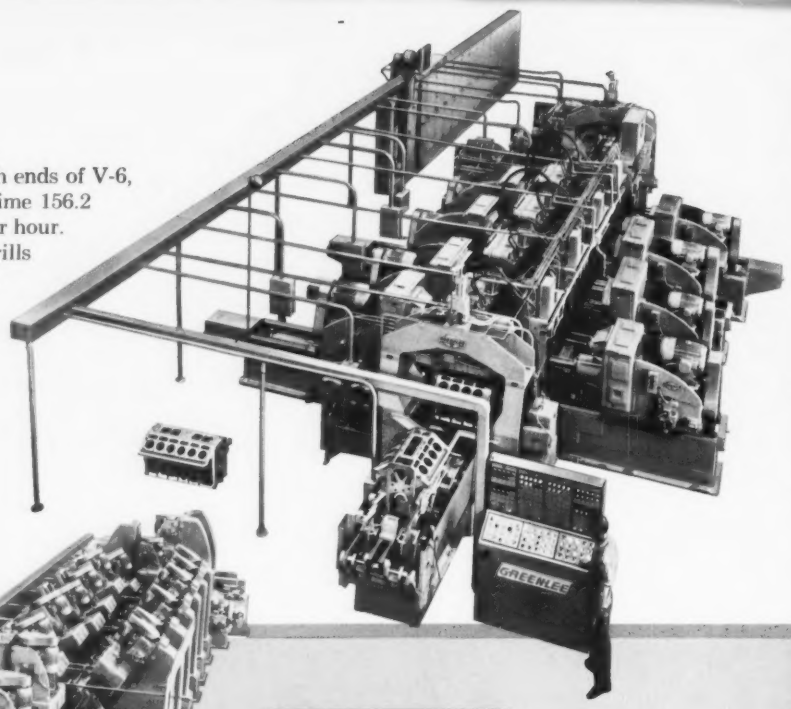
PRODUCTION MACHINERY
GREENLEE

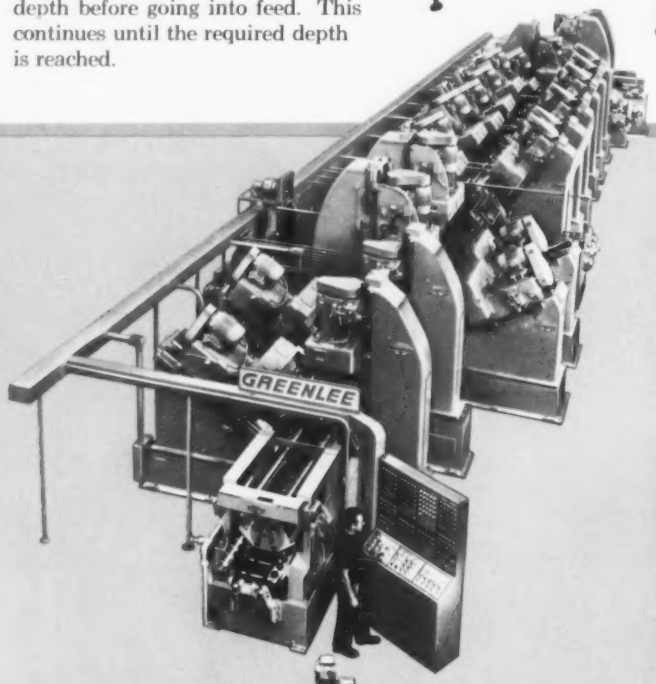


GREENLEE BROS. & CO.
ROCKFORD, ILL.

MACHINE NO. 1

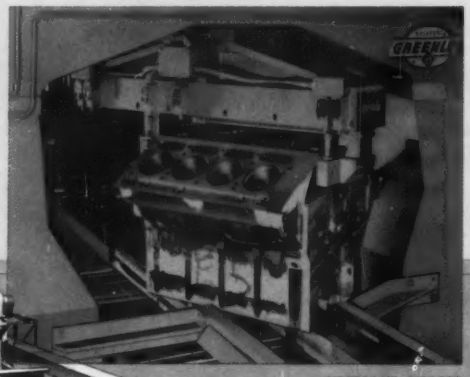
9 stations. 42 feet long. Machines both ends of V-6, V-8 and V-12 cylinder blocks. Cycle time 156.2 seconds. Gross production 23 pieces per hour. Rough bores cam and crank holes. Drills 3 oil galley holes 11 to 18 inches deep. Drills holes for tapping operations. Block is turned 90° in the second station. Heads for deep hole drilling have step feed (jumping jack) action, that is, the drills are fed to a certain depth and then retracted to remove chips. Successive passes rapid-approach to the last drilled depth before going into feed. This continues until the required depth is reached.





MACHINE NO. 2

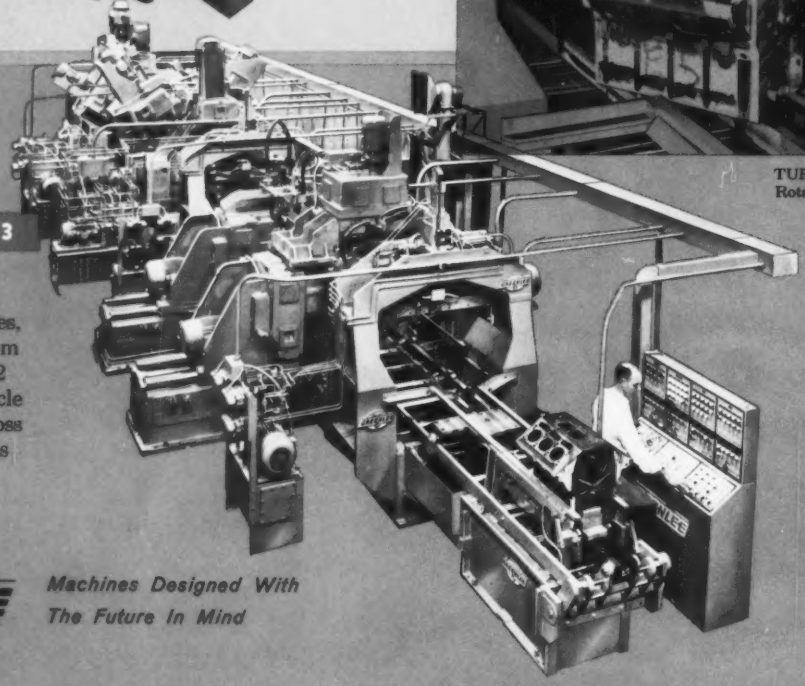
16 stations. 104 feet long. Machines top, bottom, sides and banks of V-6, V-8 and V-12 cylinder blocks. Cycle time 144 seconds. Gross production 25 pieces per hour.



TURN STATION
Rotates Block 90°

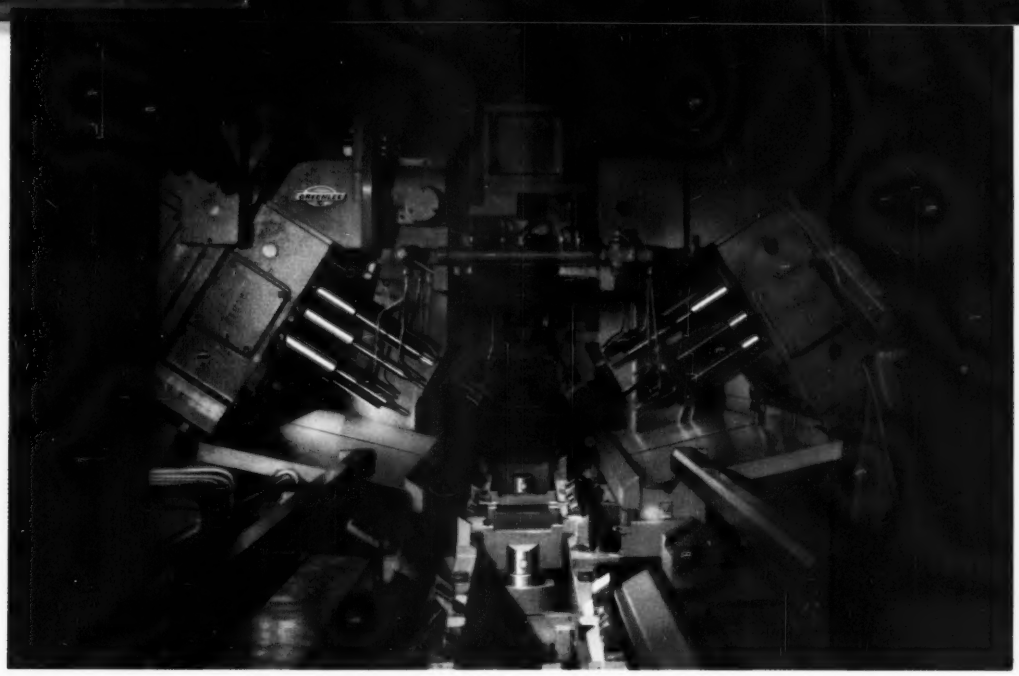
MACHINE NO. 3

11 stations. 64 feet long. Taps ends, sides, banks, top and bottom of V-6, V-8 and V-12 cylinder blocks. Cycle time 35 seconds. Gross production 104 pieces per hour.



GREENLEE

Machines Designed With The Future In Mind



Planned for quick, easy changeovers

A leading manufacturer of diesel engines now includes V-type models in its newly expanded line. In the early stages of planning for production, Greenlee representatives were called in. The problem was not a simple one. Although production rates would not be high — all three cylinder blocks for V-6, V-8 and V-12 engines would have to be processed on the same machines. Changeover time from processing one size block to another must be held to a minimum.

COOPERATION IN DESIGN

To help attain the necessary flexibility, the customer's engineers did an exceptionally good job of designing the blocks for interchangeable processing. Each cylinder, for example, has its own pattern of holes and bearings to permit easy changeover. Components were standardized wherever possible. Greenlee engineers working in close cooperation were able to take full advantage of this flexibility in design to provide further flexibility in machining. Lower initial cost and greater production economies resulted.

MACHINE CHANGES SIZE

When processing the ends of blocks in each of three sizes, the fixture frame and machining heads must be moved to accommodate increased or decreased length of block. A lever pulls the locating pin at each station. When all pins are pulled a push button is pressed and the adjustable part of the machine, together with the transfer bar on that side, moves to its new position. Locating pins accurately position the fixture side frame in its new location.

DOWEL SELECTION

The selection of the proper locating dowel in each station for each size block is controlled by a series of levers. The machines are automatically controlled to operate only when all the levers are set for the same size block.

TOOL CHARTS

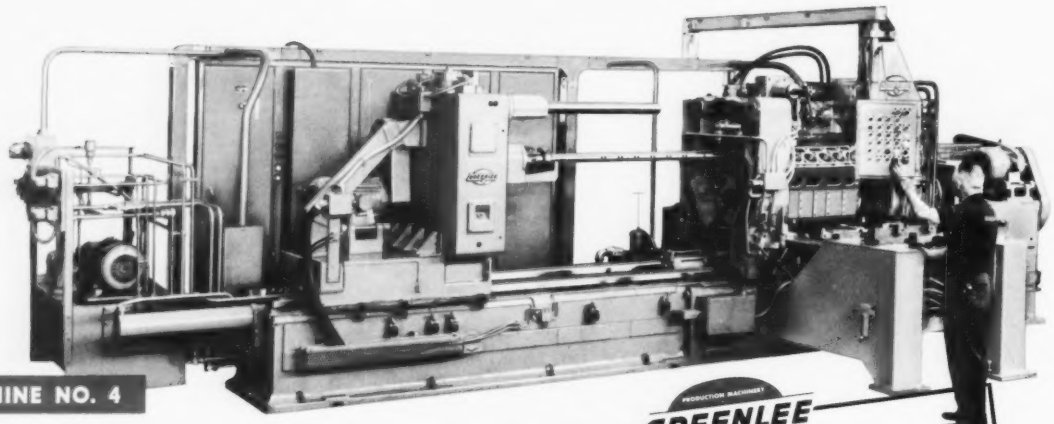
The correct tools and set-up for each size block are readily determined by following the tool charts and changeover check lists supplied with the machines. These charts help reduce changeover time and minimize the possibility of error.

FLEXIBILITY OF OPERATION

These machines were designed to process both cast iron and aluminum blocks. The ease with which they can be changed over from cast iron to aluminum machining demonstrates their extreme flexibility. Variable feed rates and ease of tool change make it possible to change from machining cast iron to machining aluminum in a minimum of down time.

HANDLING

A walking-beam type transfer mechanism is used to carry the blocks from station to station. The blocks are *carried*, not *skidded* through all five machines. Machine No. 1 has two turn stations, rotating 90°. Machine No. 2 has one 180° turnover station. Machine No. 3 has two turn stations rotating 90°, and one 180° turnover station. These 90° rotating stations are designed to handle the three different sizes of blocks without adjustment. The 180° turnover stations are manually adjusted in seconds to accommodate any of the three block sizes.



MACHINE NO. 4

Two-way horizontal machine automatically semi-finish bores cam holes, and finish cross-faces rear thrust bearing. Cycle time 103 seconds. Gross production 35 pieces per hour.

The sequence of operations automatically performed on this machine is as follows:

(1) Block is conveyed to machining position.

(2) Block is positioned to receive boring bar.

(3) Boring bar is advanced.

(4) Block is located for the boring cut.

(5) Boring bar is rotated and fed on the return stroke. This results in a pulling action keeping the bar in tension and eliminating vibration.

(6) After boring operation is completed, bar is positioned radially, block is positioned and bar is withdrawn.

(7) Block is removed from machine.

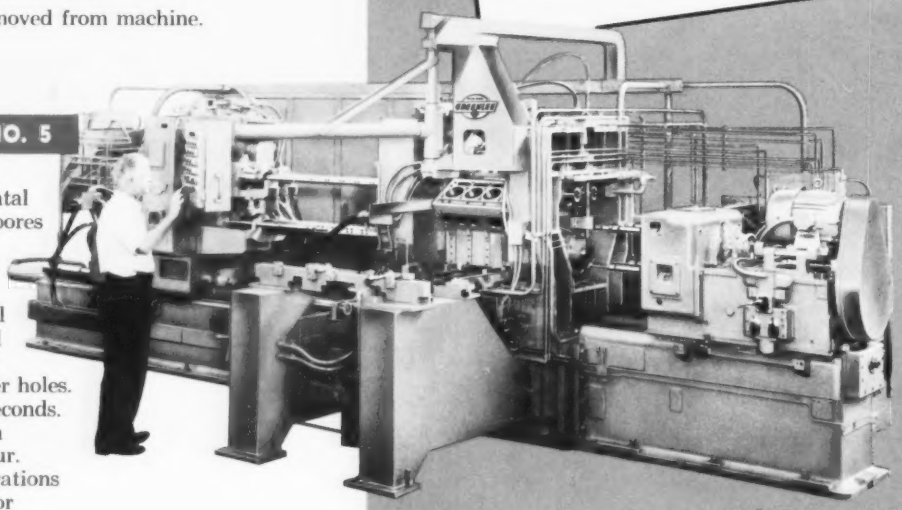
GREENLEE

FACILITIES and EXPERIENCE

(1) Greenlee plant facilities are large enough to erect a complete line and conduct test runs with coolant supplied from a central system built into the assembly floor.

(2) Greenlee controls every step in the manufacture of the machines which it produces. Engineering, foundries, machine shops, assembly floors are all centralized in Rockford.

(3) Greenlee has the experience and proven ability to build successful transfer machines . . . is considered one of the pioneers in the field of mechanized production.



MACHINE NO. 5

Two-way horizontal machine finish bores cam holes. Finish bores crank bore. Reams two dowel holes in each end of block. Finish counterbores idler holes. Cycle time 131 seconds. Gross production 27 pieces per hour. Sequence of operations is the same as for Machine No. 4.

GREENLEE BROS. & CO.

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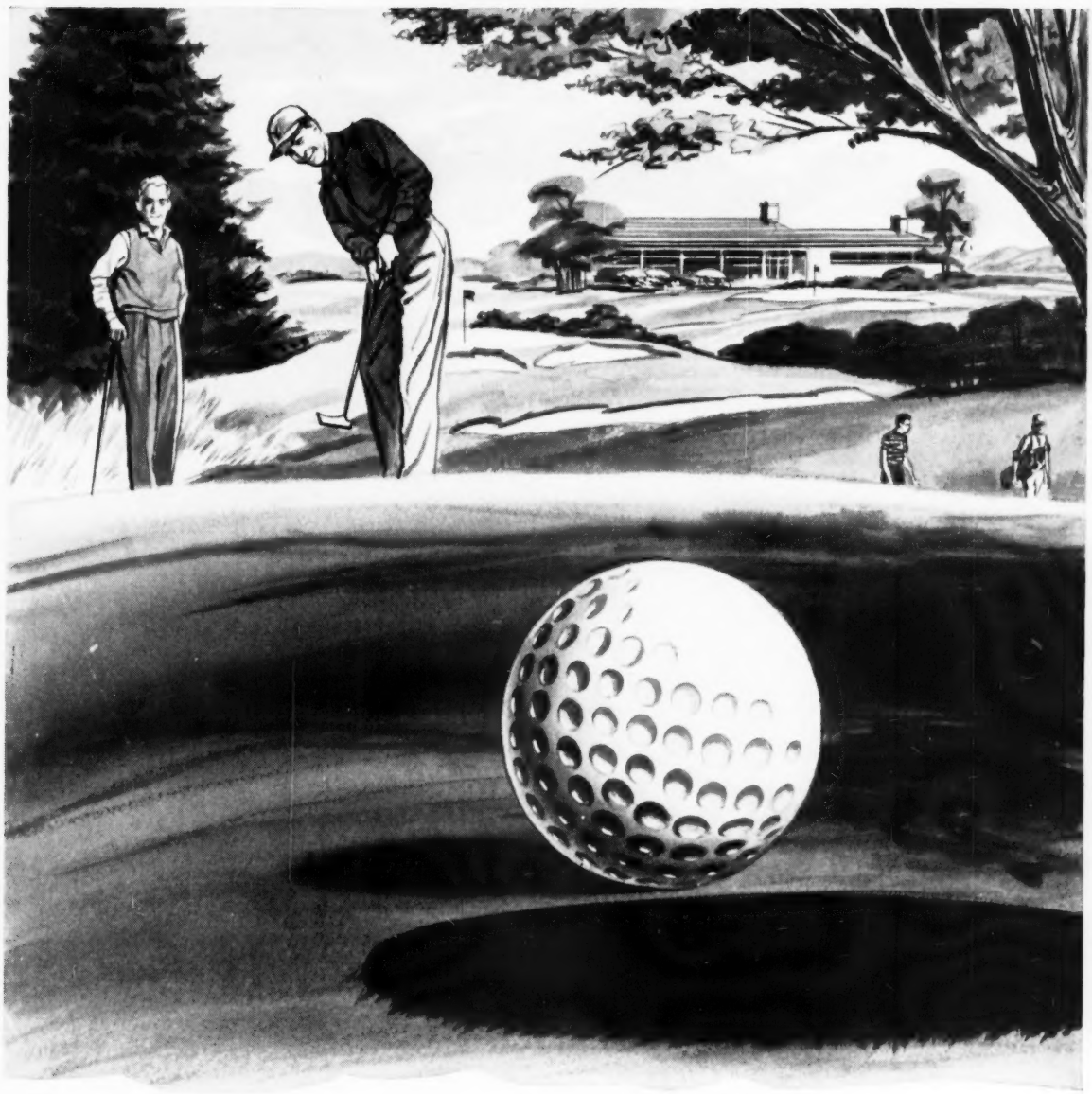

PAR is just another habit!

When you keep your eye on the ball — and keep playing the game for all you're worth, day after day — you're pretty sure to be a better-than-average performer.

That's the way it goes in the brass mill business, too. And here at Bristol we are able to score consistently enough — both in production and service — so that quite a few of the country's top users of sheet, rod and wire have taken us on as their partner. We'll be glad to team up with *you*, any time you say.

The **BRISTOL BRASS**
CORPORATION

Since 1850, makers of Brass strip, rod and wire in Bristol, Connecticut
Bristol Brass has offices and warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse

AND FOR BRASS FORGINGS, TOO . . . ACCURATE BRASS CORP. (SUBSIDIARY OF THE BRISTOL BRASS CORP.), BRISTOL, CONNECTICUT.

Cuts inventory, yet widens range of "custom" machining

GULF MAKES THINGS

How do you maintain "custom" standards of machining, and yet hold down operating costs in the face of a constantly expanding diversity of projects?

That was the problem faced by the Rolling Mill Division of E. W. Bliss Company, Salem, Ohio. This division produces a wide variety of metal processing equipment, from machine tools of bench-top size to multi-million dollar rolling mill installations.

H. G. Gibson, Plant Engineer of the Rolling Mill Division, found the answer in just three of the multi-purpose cutting oils in the Gulfcut line. Gulfcut 21A, Gulfcut 31A and Gulfcut Soluble Oil proved effective over the complete range of tough machining jobs at the plant, and permitted a wholesale reduction in oil inventory.

"Our alternative," reports Mr. Gibson, "would be a stockpile of individual cutting oils and special additives for individual jobs—with a resulting step-up in inventory costs. But these 3 Gulfcut oils meet *all* our machining requirements.

"In high-precision gear hobbing, for example, Gulfcut 21A—a sulfurized-mineral oil—dissipates the extreme heat rapidly and thus checks expansion of both hob and workpiece. Helps us hold tolerances within .001″ in this operation.

"In the boring, facing and turning of large gear rings, Gulfcut Soluble Oil gives us the critical cooling required

Gulf man on the job checks precision-hobbed gears at Rolling Mill Division of E. W. Bliss, where Gulf helps make things run better. Left, Fred Sweitzer, General Superintendent. Right, William A. Stranko, Gulf Sales Representative.

Hobbing helical gears for rolling mill tables, on a 72" gear hobber, at Rolling Mill Division of E. W. Bliss Company. Hob is flooded with Gulfcut 21A, which helps achieve rough hobbing of .625" and finish hobbing of .090" on steel of 280-311 Brinell hardness. Pinion is cut at 7½° helix angle in the illustration at left.

with 3 multi-purpose Gulfcut oils . . .

RUN BETTER!

and permits a feed of 325 sfpm with no loss in tool life.

"In a tough screw-cutting operation, where the piece is 25 feet long, Gulfcut 31A—a sulfurized-mineral-lard oil—helps us achieve the specified 16 micro-inch rms finish on highly polished screws used in steel mill roll changing units.

"In hundreds of other jobs, these 3 multi-purpose Gulfcut oils help us maintain our high machining standards on a low oil inventory."

Your plant can cut machining costs and upgrade production with Gulfcut oils. There's a grade for every need in the complete Gulfcut line. Call your nearest Gulf office or mail coupon for illustrated bulletins.

GULF

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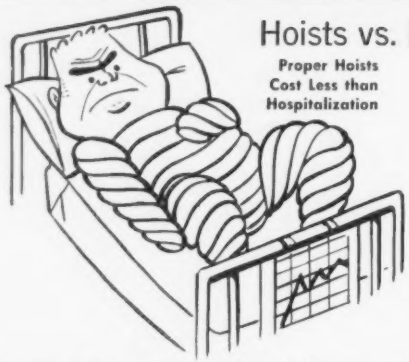
Tuffy Tips —on safe use of Slings and Hoist Lines



Hoists vs. Hernia

Proper Hoists Cost Less than Hospitalization

A manufacturer said recently that 75% of his compensation claims were connected with hernia—a common hazard in heavy lifting. About the same time, we heard from the Ohio Bureau of Workmen's Compensation that the average hernia claim (circa 1957) was $750. No need to stress the need for hoists instead of muscle for lifting tasks. Said "Occupational Hazards" magazine: (Hoists) with proper attention, given slings and periodic inspections, will help substantially in reducing back injuries and hernia claims by reducing the strain on workers."

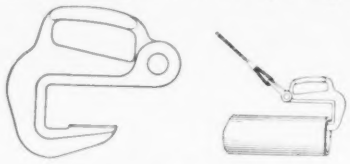
A Few Rules for Safe Use of Hoists and Slings

1. Use a proper size hoist—not human backs and muscles—for every heavy lifting job.
2. Never use load chains as slings. Chain links break easily after distortion.
3. Use the sling that's right for the job. There's a Tuffy Sling for every purpose.
4. When loading slings with more than 2 legs: load a 3-legged sling as though it had 2½ legs; load a 4-legged sling as though it had 3 legs.

Proper Fittings Give Slings Added Safety and Service Life

Union offers a sling fitting for every need. We recommend having them factory-fitted when you order your slings, but they can also be fitted in your own rigging loft. Shown here are two of a score of different fittings used on Tuffy Slings.

NEWCO STANDARD CHOKER HOOK: Standard in design, but extra high in quality and safety. Castings are always smooth and clean. No cutting or chafing slings. This hook can be attached to the end of sling instead of the main body, thus allowing the main part of the sling to be free of fittings.



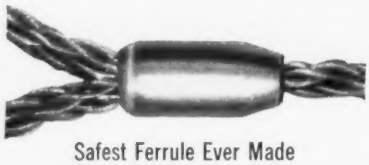
NEWCO PIPE HOOK: Precisely "tailored" to the job of moving and laying pipe. High strength steel. Capacity of 3500 lbs. Pad at end allows threaded pipe to be handled without damage to threads. Eye opening is large enough to accommodate a shackle or thimble. Hook has a lifting handle for easy moving.

Made for Each Other: Tuffy Slings and Hoist Lines

Tuffy Slings and Hoist Lines make a top-performing team for every kind of hoisting work. Tuffy Slings are made of a patented, 9-part machine-braided wire fabric that's extra flexible, and isn't materially damaged by knotting or kinking. Tuffy Hoist Line is a special rope construction for use on all types of overhead cranes, derricks and clamshells—and wherever else an extra-quality, extra safe hoist line is needed. Reports from the field tell of Tuffy Hoist Lines running two and three times as long as ropes previously used.

Tuffy Kink-Resistance is Unmatched

Kinking is one of the worst hazards of wire rope and sling use. With ordinary wire rope slings, an acute kink results in serious damage and weakening that makes the rope unsafe for further use. With Tuffy, it's a different story. The super-flexible fabric is just about impossible to kink. If it does under exceptional conditions, the kink can be easily straightened out with no harm done.



Safest Ferrule Ever Made

The pressed-on steel ferrule is applied under great pressure. The ferrule metal virtually flows into voids between wires and strands of the fabric. Result: an eye splice with 100% of fabric strength, and a ferrule so smoothly tapered to the sling body that there are no abrupt edges or rough projections to snag or injure hands. And the extra service life, efficiency and safety of Tuffy's pressed-on ferrule are yours at no extra cost.

FREE! New Tuffy Sling Handbook

Revised and enlarged edition. Covers all the bases in selection and use of Tuffy Slings and fittings. Gives types, dimensions and rated loads. Includes safety-approved hand and whistle signals in operation of various equipment. Send for your copy now. **Write Union Wire Rope Corporation, 2160 Manchester Ave., Kansas City 26, Mo.**

Specialists in high-carbon wire, rope, braided wire fabric and stress relieved wire and strand.

Your Tuffy Distributor is Ready to Help You with any Sling or Wire Rope Problem

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56-inch semi-continuous hot strip mill.

BLAW-KNOX HOT STRIP MILLS

Blaw-Knox designs and builds a full range of continuous, semi-continuous and single stand reversing hot strip mills. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron, and steel rolls, Blaw-Knox Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

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This giant steelman is the Image of CF&I—a major source of American industry's steel supply. CF&I manufactures a complete range of steel products for many uses—for instance, alloy steel plates produced at our Claymont, Delaware plant.

Claymont makes its own open-hearth steel and rolls its own carbon and alloy steel plates.

Claymont alloy steel plates are regularly produced to the following specifications:

ASTM A-202 • A-203 • A-204 • A-225 A-302 • A-353 • A-387 • AISI Specs 4140 • 4130

We also invite inquiries on other specifications to meet your requirements.

Claymont is ideally located to serve your quick-delivery needs, by water, highway or rail. Shipment-from-stock is provided on commonly-used types of carbon and alloy steel plates.

For complete information and prompt service, contact the CF&I sales office nearest you.

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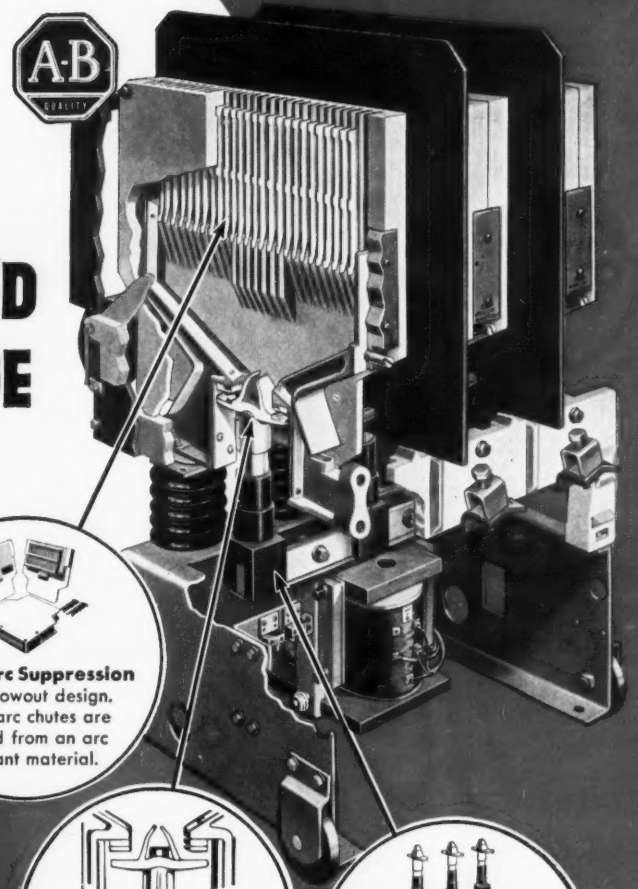
Here's the inside story of industry's

MOST RUGGED HIGH VOLTAGE SWITCH



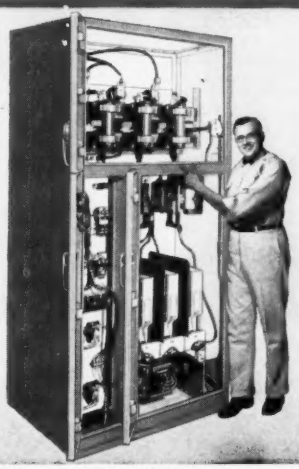
THIS SOLENOID AIR BREAK CONTACTOR IS THE HEART OF THE A-B STARTER LINE

A tremendous operating life has been built into these new A-B high voltage, air break starters by using the same simple solenoid design—with only ONE moving part—that has proved good for millions of trouble free operations in Allen-Bradley low voltage starters. A-B high voltage starters are made for all types of service and for all types of motors up to 1500 hp, 2300 v; 2500 hp, 4600 v. Send for Publication 6080, today.

Faster Arc Suppression
New blowout design. Novel arc chutes are molded from an arc resistant material.

Double Break Contacts
Silver alloy contacts never need maintenance. Vertical motion assures uniform contact pressures.

Only One Moving Part
Simple solenoid design eliminates trouble-causing pins, pivots, and flexible jumpers.



A-B High Voltage Starter with Air Break Contactor

Bulletin 1159 high voltage air break, across-the-line induction motor starter in NEMA Type 1 enclosure. All Allen-Bradley high voltage starters are equipped with current limiting fuses with interrupting capacities of 150,000 kva at 2300 v; 250,000 kva at 4600 v.

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Republic Steel Provides Pig Iron
SERVICE IN DEPTH

UNIFORM CHEMISTRY HELPS PRODUCE HIGHEST QUALITY DIE SETS. The Producto Machine Company, Bridgeport, Connecticut, casts die set parts using only raw materials with a definite known analysis, including Republic Pig Irons. The year-in, year-out uniform chemistry of these fine irons helps Producto produce high quality, laboratory-controlled castings. The company has found that there is no better, no more economical means for insuring strong, flaw-free, easy-to-machine castings.

Pig iron *service in depth* is an exclusive Republic concept. It is designed to help you solve foundry production and metallurgical problems—designed to help you produce better castings most efficiently, economically, and profitably.

Here is how *service in depth* helps foundrymen everywhere.

First, Republic is the only producer of both Northern and Southern Irons. This means you can select the proper grade from the most complete line of merchant pig iron available in the industry. Northern grades include Chateaugay, Malleable, Bessemer, Foundry, and Basic. Southern furnaces produce Foundry and Basic.

Then, Republic provides expert metallurgical service to assist you in selection, application, and processing. Republic Pig Iron Metallurgists are frequent and welcome visitors in hundreds of foundries. They have at their fingertips information on the latest processes and techniques available for improving castings, and for expanding their use and sale. Their suggestions often result in improved operations, increased production efficiency, and in recapturing business lost to other methods of fabrication.

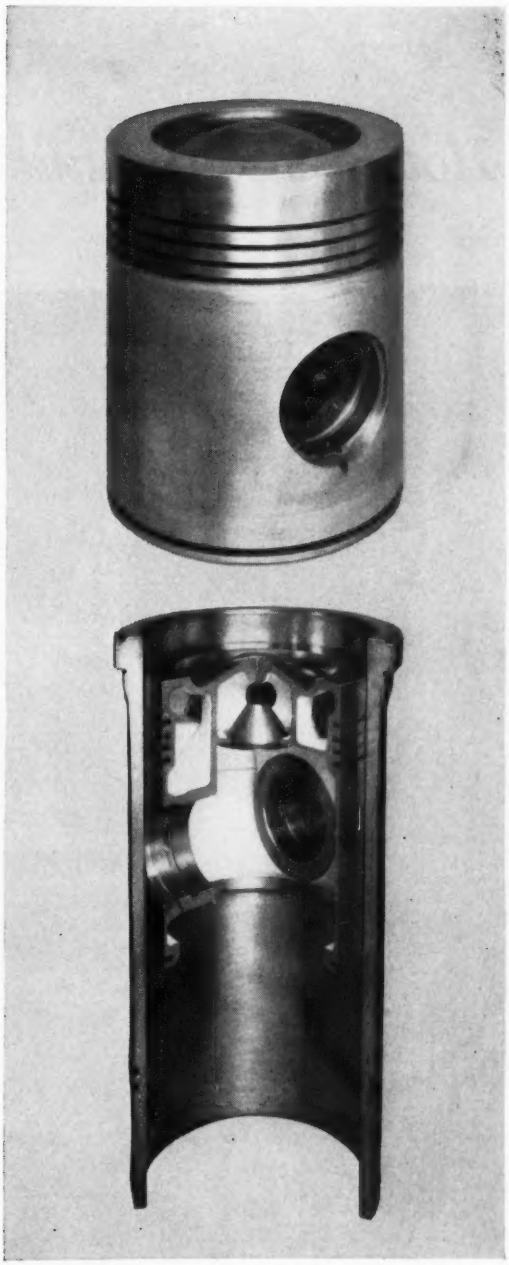
Service in depth is available now. Clip and mail the coupon for obligation-free metallurgical service, or for more information on Republic Pig Irons.

Here are three examples of pig iron *service in depth.*

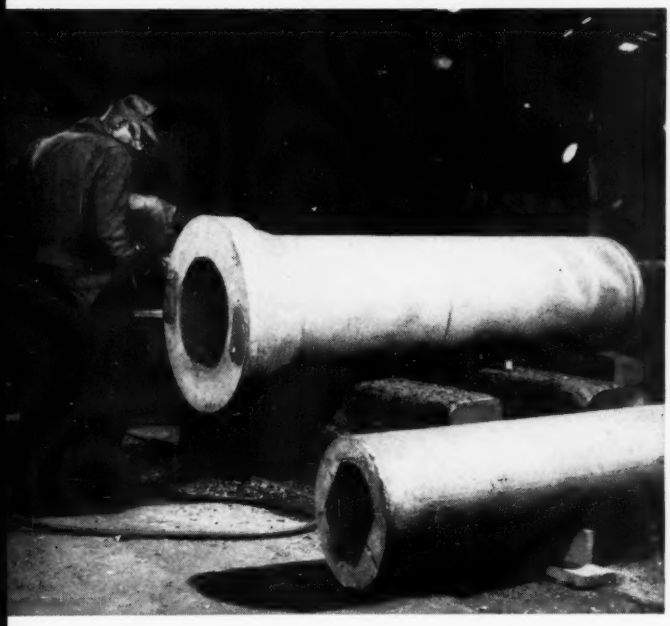
REPUBLIC

World's Widest Range of Standard Steels

CHATEAUGAY AGAIN PROVED IDEAL BASE METAL FOR DUCTILE IRON. Problem: Design a diesel engine piston with high mechanical strength, minimum weight, maximum wear- and heat-resistance, low ultimate cost. Using Chateaugay Pig Iron as the base metal, Hunt-Spiller Manufacturing Corporation, Boston, Massachusetts, successfully met all of these requirements in developing ductile iron diesel pistons as a replacement for aluminum. High total carbon and unusually low phosphorus, silicon, and manganese suit Chateaugay perfectly for ductile iron use. Inherently excellent physical properties are maintained in the ductile form assuring strong, flaw-free casting accurate to patterns and shapes.



METALLURGICAL SERVICE BENEFITS FOUNDRY'S CUSTOMER. On the advice of a Republic Pig Iron Metallurgist, Atlantic Foundry Company, Akron, Ohio, switched to Chateaugay Pig Iron for ram and cylinder castings used in hydraulic presses. The result: stronger castings, better machinability, higher wear-resistance, and a 21% saving to the customer. The value of Republic metallurgical service is pointed out in this statement by Atlantic's Vice President of Iron Foundry Operations. "When we have a foundry problem and put in a call for help, your metallurgical engineers are Johnny-on-the-spot, talking a language we can understand. Then it's not long before the problem is solved."



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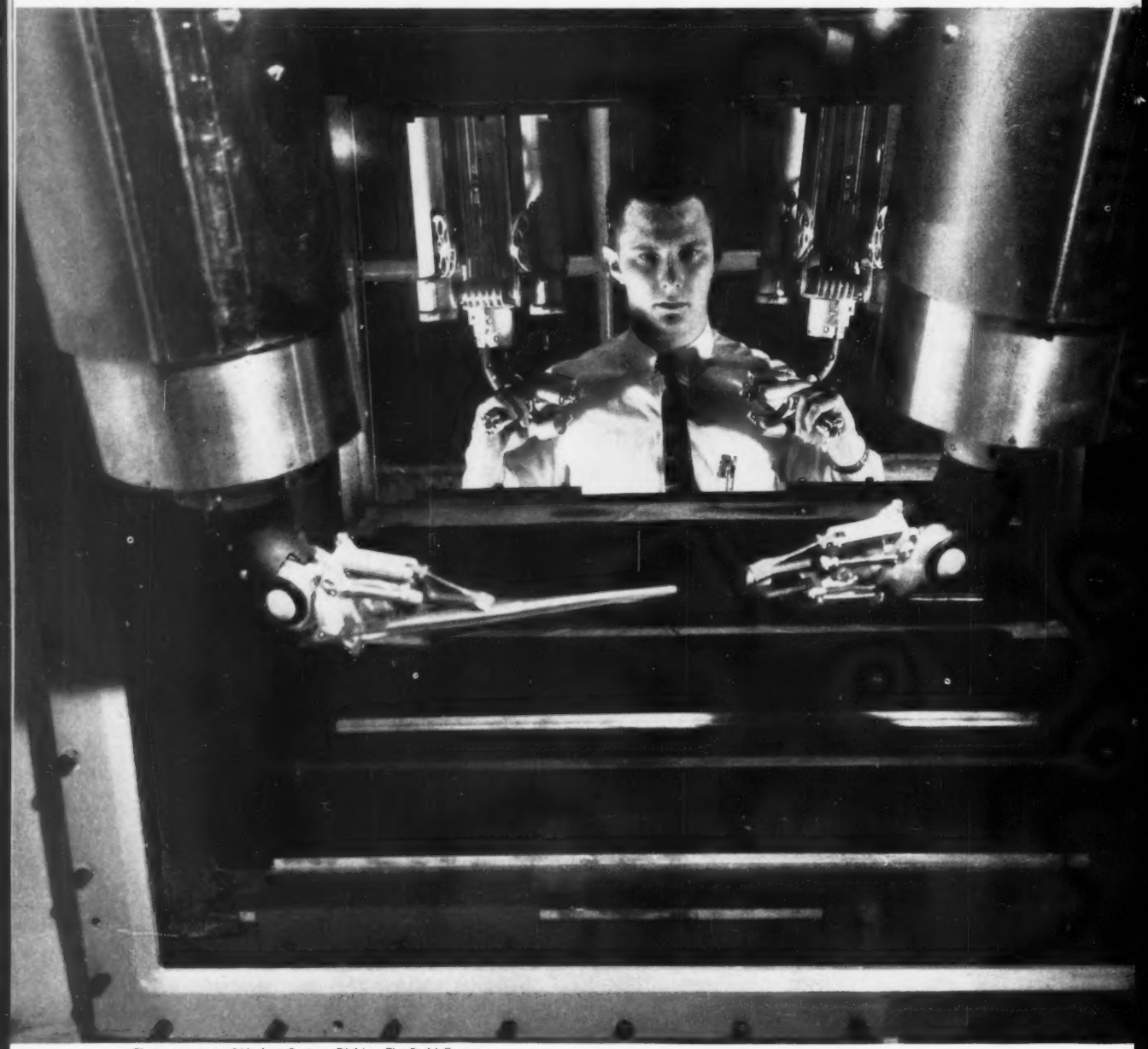
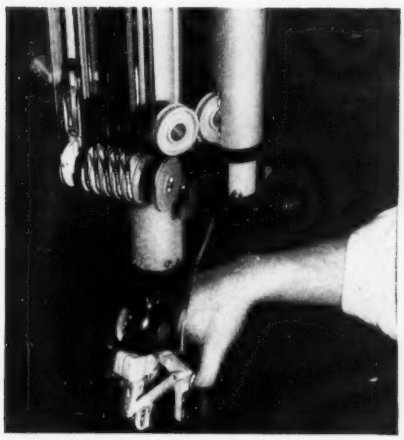
How NS solved another special steel problem



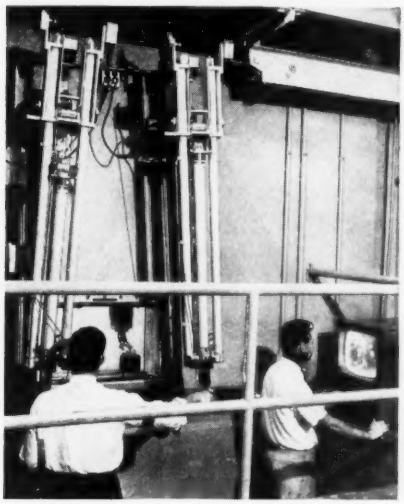
Photos courtesy of Nuclear Systems Division, The Budd Company

RADIOACTIVE MATERIAL is handled remotely by operator from behind three-foot thick lead-glass wall. Nilcor strips, which make quick, accurate system response possible, can be seen running vertically from pulleys just above operator's hands.

SPECIAL NS-ATHENIA STEEL PUTS LIFE IN ATOMIC-AGE ROBOT



HAND MOVEMENTS at operator end of master-slave system are translated without distortion, or time lag through seven Nilcor strips (shown in photo) that travel through 15-foot belt and pulley system.



To manipulate radioactive materials with lifelike dexterity, from the other side of a three-foot thick protective wall, requires robot controls with a high degree of precision and quick response.

Ordinary cable or belt arrangements gave too much stretch between the operator's "master" hand movements and the identical "slave" movement at the other end of the system. Movements had to be translated almost instantaneously and duplicated exactly at the slave end of the system. To help solve this problem, robot system manufacturers came to the Athenia Steel Division of National-Standard to find a strip material that would serve in the belt-and-pulley arrangement of the mechanism with minimum stretch and friction and without backlashing or overshooting.

NATIONAL-STANDARD ENGINEERS at Athenia in Clifton, N. J., recommended Nilcor* strip (basically a cobalt-chromium-nickel alloy) because of its high fatigue resistance, high tensile strength and exceptionally high corrosion resistance—plus less than ⅛-inch lateral sweep per 8-foot length when laying flat without tension. Experiments with .005 Nilcor strip in the robot systems showed an 80% reduction in stretch and 90% reduction in friction over standard wire materials.

EXPERIENCED ENGINEERING HELP of this kind, for jobs requiring specialty steel and wire to meet unique applications, is available to *you* from National-Standard. For the many thousands of applications where only specialty steel or wire will solve the problem, let National-Standard engineers go to work for you. Write for additional information to National-Standard Company, Niles, Michigan.

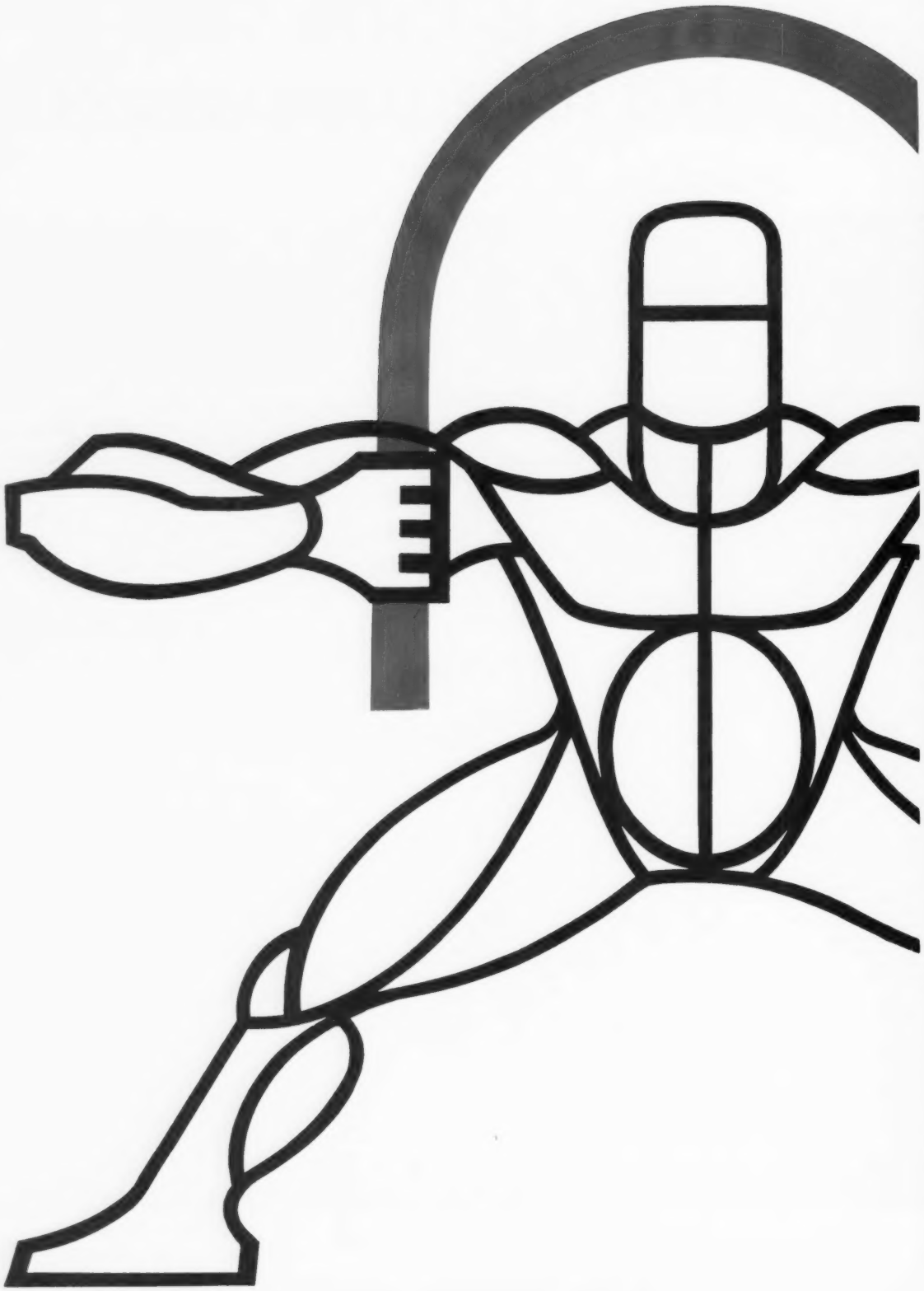
OPERATOR STATION, shielded by protective wall, has television monitor screen where action inside radioactive room is reproduced as operator manipulates controls of master-slave system.

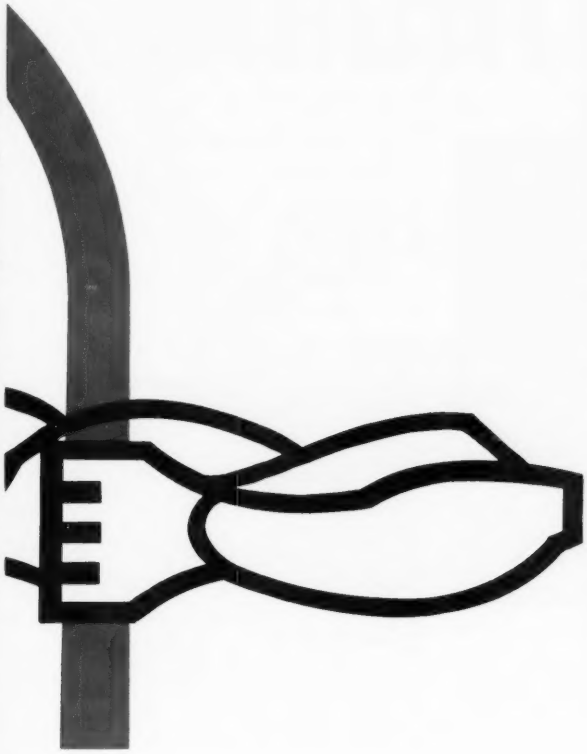
*Trade Mark

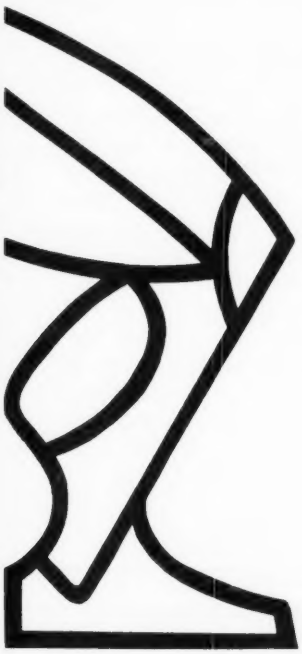
Manufacturer of Specialty Wire and Metal Products

NATIONAL STANDARD

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • **WORCESTER WIRE WORKS** Worcester, Mass.; high and low carbon specialty wires • **WAGNER LITHO MACHINERY,** Secaucus, N. J.; metal decorating equipment • **ATHENIA STEEL,** Clifton, N. J.; flat, high-carbon spring steels • **REYNOLDS WIRE,** Dixon, Ill.; industrial wire cloth • **CROSS PERFORATED METALS,** Carbondale, Pa.; decorative, commercial, and industrial perforated metals.







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N-A-XTRA

BEST LOW-ALLOY EXTRA-STRENGTH STEEL YOU CAN BUY

N-A-XTRA HIGH-STRENGTH is a heat-treated steel now available in minimum yield strengths of 80,000-110,000 psi.

Unlike most steels of this strength and toughness, N-A-XTRA can be cold formed into difficult shapes, gas-cut, sheared, machined, and otherwise handled by conventional fabricating methods. It has superb weldability—by any process. And its great strength gives designers and engineers a unique opportunity to eliminate useless dead weight from finished products.

For complete information on N-A-XTRA—the best low-alloy extra high-strength steel you can buy—write Great Lakes Steel Corporation, Detroit 29, Michigan, Dept. B-9.

N-A-XTRA

GREAT LAKES STEEL

A DIVISION OF NATIONAL STEEL CORPORATION

Lincoln

WELDYNAMICS

NEWS ABOUT ARC WELDING AT WORK CUTTING COSTS

Sixteen 50-foot coach frames are assembled, welded and painted on this jig in one day.

SWITCHES ELECTRODE . . . SAVES $8,000

Guerdon Industries, Inc. of Newton, Kansas, builders of "Great Lakes" mobile homes, have doubled welding speed on undercarriages by a seemingly simple switch of electrodes.

Actually, the change was made as a result of a painstaking study by Ken Rymer, Guerdon's Welding Foreman; James Mandrut, Plant Superintendent and Bob Clemens, Lincoln's welding engineer in the area.

The frames consist of 13 gauge formed cross members welded in a jig to 12 gauge channels which form the longitudinal members. Length varies from 14 to 50 feet. Welds are made in vertical down and flat position and are of short duration thus requiring good restrike characteristics. The electrode also must combat light scale and oil.

Tests proved that Fleetweld 37, Lincoln's E-6013 electrode at 250 amps was twice as fast as the E-6010 rod previously used. Also cleaning time was greatly reduced because Fleetweld 37 has very little spatter.

At the present time, Guerdon's Newton plant turns out 16, fifty foot frames a day on one jig. Savings are averaging over $8,000 per year over the previous method.

Fleetweld 37 electrodes are ideal for short, high speed welds. Light rust and oil are no problem.

Mr. Mandrut states, "We look on Bob Clemens as our own welding engineer. He's always ready to tackle and solve our welding problems."

For help with procedures and cost reduction ideas, call your Lincoln welding engineer today.

Guerdon's Jim Mandrut, "Lincoln engineering service is outstanding."

WELDIRECTORY AIDS ELECTRODE SELECTION

Matching the electrode to the job for the most efficient welding is greatly simplified by the new Weldirectory of Mild Steel Electrodes.

Electrodes are grouped according to performance characteristics, and each electrode is discussed individually so that the user can determine exactly which electrode best suits his purpose.

A copy may be obtained by writing to The Lincoln Electric Co., and requesting Bulletin 7000.1.

THE LINCOLN ELECTRIC COMPANY

Dept. 1655 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Ingot Mold Cars . . .

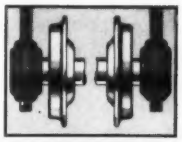
built to last by a company that uses them!

5 unique structural features make them better

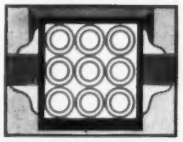
Ingot Mold Cars take more punishment than perhaps any other cars in a modern steel plant. In the 36 years we have been making these cars for our own use, United States Steel has developed a number of features in structural design that assure longer life, less maintenance, and dependable service.

Shown here is a typical 8-wheel, 200-ton capacity Ingot Mold Car. The advantages illustrated at the right—plus the rugged durability of all-welded rolled-steel construction—make any size USS Ingot Mold Car a profitable investment.

Our representative will be pleased to call at your convenience to discuss your requirements for this or any other type of industrial car. For more information, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS is a registered trademark*

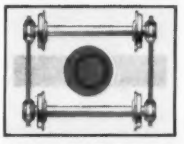


Anti-friction outboard bearings: High-capacity anti-friction bearings are located *outside* each of the car's eight wheels to minimize sideway and to provide long, smooth-running performance.



Seventy-two coil springs: Nine coil springs between each two wheels on both sides of the car—plus nine overload coils *inside* these—provide a total of 72 separate springs for a shock-absorbed *level* ride, so important in hauling molten metal.

High engineering safety factor: Designed for a 200-ton normal capacity load—including ingots, molds and stools—each car has a substantial built-in safety factor to withstand maximum ingot-stripping thrusts.



Oversize center plates: "Beefed-up" center plates between the trucks and car body are 18 inches in diameter—compared with the conventional 12 inches—to reduce the load per square inch on their surfaces.

Hot-metal shields: Curved end plates, long side skirts, and special drip shields protect the couplers, bearings and springs from runover molten metal and troublesome solidified drippings.

United States Steel Corporation — Pittsburgh
Columbia-Geneva Steel — San Francisco
Tennessee Coal & Iron — Fairfield, Alabama
United States Steel Export Company

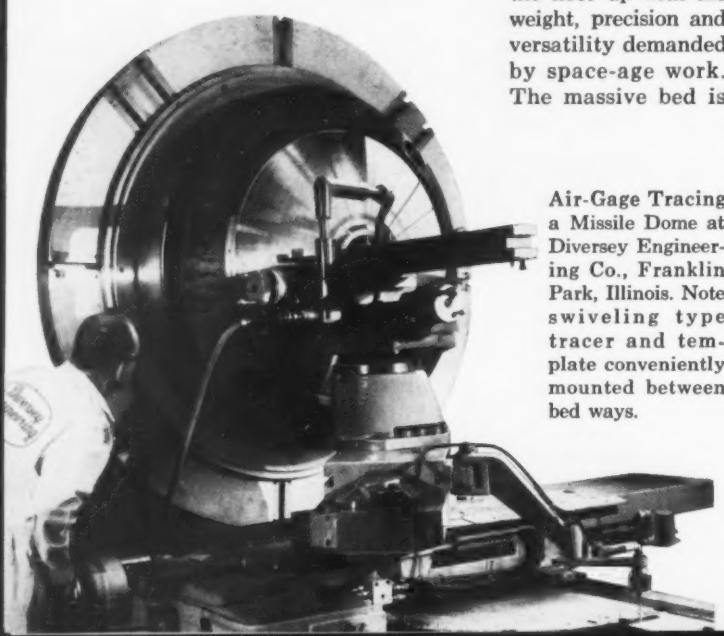
United States Steel

Don't Tool Up

6 THE MISSILE MASTER—finest of the

This is *the* lathe for you—if you are interested in the contour turning, boring and facing of missile components or other large thin-walled and fabricated parts.

As these photos tell you, this machine is BIG. And it's newly-designed for size from the floor up with the weight, precision and versatility demanded by space-age work. The massive bed is 54" wide, with extra-wide, flame-hardened and ground carriage ways. And you can almost feel the strength in the specially-designed headstock, carriage, slides and tailstock.



Air-Gage Tracing a Missile Dome at Diversey Engineering Co., Franklin Park, Illinois. Note swiveling type tracer and template conveniently mounted between bed ways.

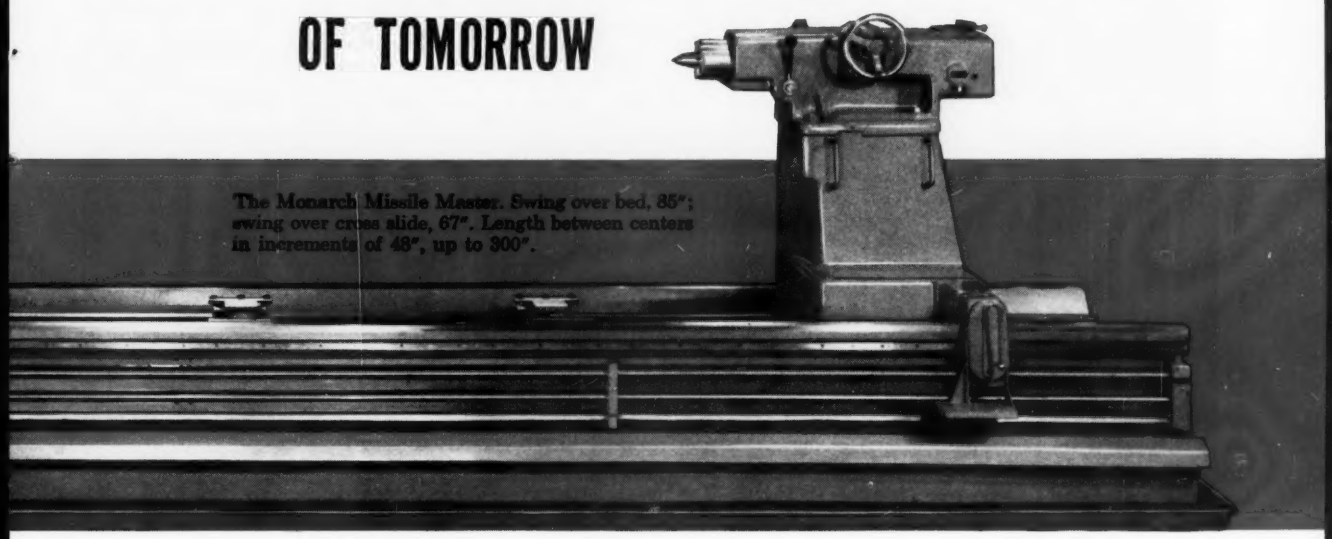
EXCLUSIVE PERFORMANCE FEATURES

The swiveling type Monarch Air-Gage Tracer generates complex shapes in an extreme contour range with an efficiency unequalled through any other means. Its unrivalled accuracy of reproduction is of the greatest value when working with high strength alloys, in complex thin-walled sections which must be machined to ultra-close tolerances and critical surface finishes. You'll like the template mounting between the bed ways. This permits easy adjustment from the front of the machine. Template tool control is possible over work diameter variations up to 70".

Large diameter work requires low spindle speeds. Augmenting the spindle drive, the time-proved, exclusive Monarch face plate drive assures full power applied far out from the work axis. This also widens the speed range, affording a choice of 24 speeds. Constant surface cutting speed control over a 4 to 1 range is available.

for Tomorrow's Boom with Yesterday's Lathes

MONARCH SPECIAL PURPOSE LATHES OF TOMORROW



The Monarch Missile Master. Swing over bed, 85"; swing over cross slide, 67". Length between centers in increments of 48", up to 300".

space-age giants—*New from the floor up*

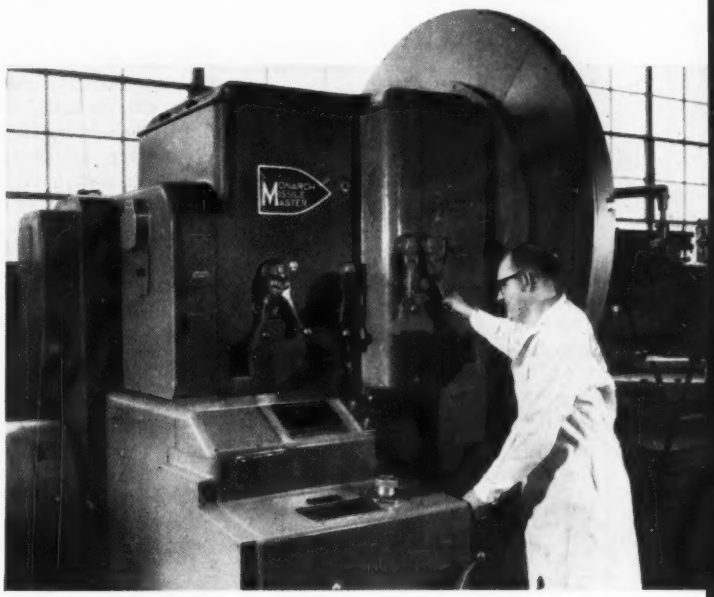
CHECK THE FIELD

We invite your comparison of the Missile Master to any other lathe that might be considered in its class. Send for our Specification Brochure #2101. Then—if you really want to get your space-age work off the ground—make floor-space for the Missile Master! . . . The Monarch Machine Tool Company, Sidney, Ohio.

MISSILE MASTER APPLICATIONS

Missile Parts: Nose sections, nozzles, motor cases, bulkheads, air frame sections, hemispherical or elliptical domes.
Other Parts: Any large, thin-walled and fabricated parts: rolls, cylinders, spiders, jet engine components, valve gates, electrodes, etc.

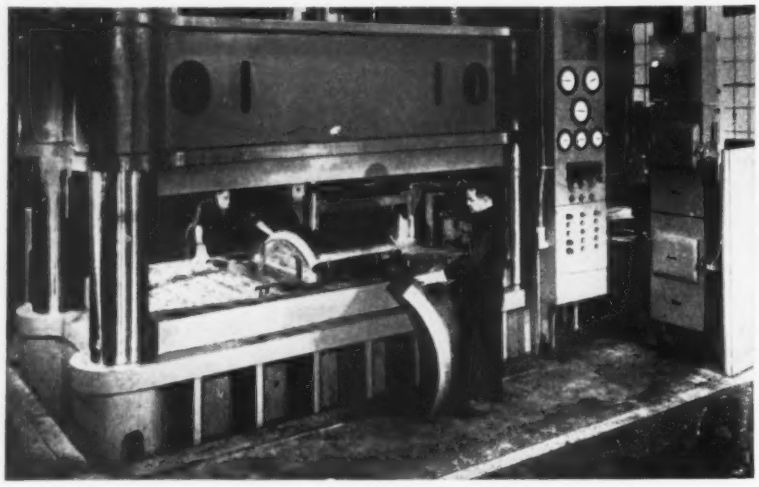
Monarch
TURNING MACHINES



We Don't Expect a Boy to Do a Man's Work! Look at that massive face plate drive headstock. Gear box is totally enclosed as you would expect on a modern lathe.

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER

Lubrication



PREMIUM HYDRAULIC OILS CAN MORE THAN PAY BACK THEIR INITIAL EXTRA COST

Laboratory experiments, exhaustive field tests and, finally, general industrial experience have conclusively proved the long-term economy of a premium hydraulic oil over even the best straight mineral oil.

What makes a premium oil different? Straight mineral oil is a highly refined product containing many good lubricating qualities. However, it may be subject to fairly rapid oxidation, and it foams persistently when agitated.

On the other hand, a premium hydraulic oil, like Texaco Regal Oil R&O, contains a number of additives specifically designed to minimize or eliminate the undesirable qualities of straight mineral oil, while retaining the good.

Importance of these qualities in a hydraulic system. Oxidation, rust and foam all breed trouble in hydraulic sytems, even though they may not be immediately apparent. Because Regal Oil R&O is specifically inhibited to guard against these dangers, you can expect four distinct areas of savings, in spite of higher initial cost, when you install this premium oil in your hydraulic equipment:

It saves man-hours. Because a premimum hydraulic oil is inhibited against oxidation and rust, it will not form sludge in the system or allow parts to corrode. This can more than double the intervals between scheduled overhauls, saving valuable maintenance man-hours.

It prevents production losses. By keeping hydraulic systems clean, Regal Oil R&O guards against those sudden, unexpected stoppages that halt production, are costly to overcome. Pumps and other parts last much longer, too.

It cuts rejects when used in production equipment. Regal Oil R&O is inhibited against foaming. And foam, which causes jerky operation, can be a large factor in ruined machine parts.

It reduces oil drains. Because Regal Oil R&O lasts longer than straight mineral oil, systems don't have to be refilled nearly so often. The savings on this one factor alone are often enough to counterbalance the higher initial cost of Regal Oil R&O.

Way found to coat steel concrete forms without wasting oil

How to coat steel concrete forms without wasting a large amount of the oil in run-off has always been a problem for manufacturers of concrete products.

One of the country's leading concrete pipe producers has now licked this problem by using a 50-50 mixture of diesel fuel and Texaco Stazon. Originally developed as a non drip product for textile mills, this unique Texaco lubricant clings just as well to steel forms. The pipe manufacturer reports that run-off has now been eliminated completely. The new mixture can be used in temperatures as low as 0°F and can be either sprayed or painted on the forms.

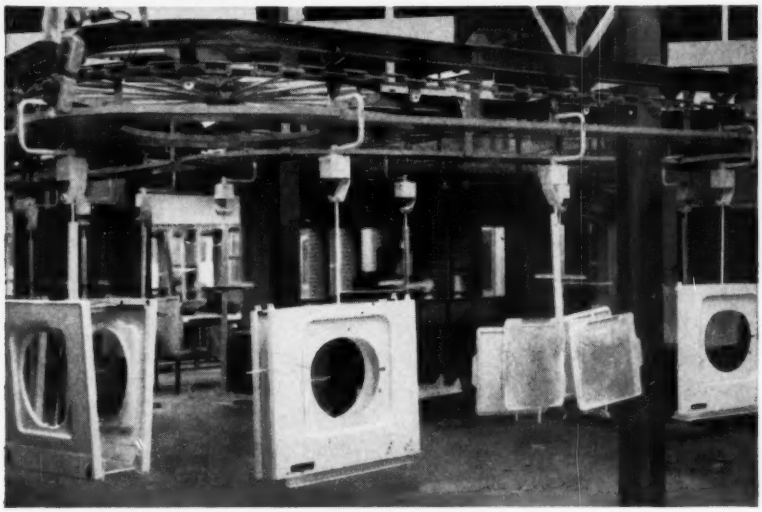
MOVIE OF THE MONTH

SEE...

"Shear Magic"

Texaco's new full-color film on the nature and uses of grease is a must-see feature for anyone interested in getting the most out of grease-lubricated equipment.

news



How manufacturer eliminated rejects caused by flaking conveyor

Flakes of rust dropping from the plant-wide conveyor system onto newly painted finishes were causing an unhealthy 10% reject rate for one manufacturer of large household appliances. His problem: the conveyor traveled through areas where the humidity was high, as well as through baking ovens. These widely varying heat and moisture conditions were too much for the conveyor finish.

Texaco called in. Although the problem was not directly associated with lubrication, the visiting Texaco Lubrication Engineer heard about it and recommended having the conveyor sprayed with Texaco Rustproof Compound L. This versatile Texaco product withstood both the excessive humidity and the high temperatures that the conveyor encountered in its travels around the plant. Rusting ceased and rejects of the finished product dropped drastically from 10% to a normal 1½%.

New Seagram building gets cutting oil bath

In one of the most unusual uses for a petroleum product yet, the Seagram building, on New York's Park Avenue, recently employed Texaco Sultex Cutting Oil as a bath for its unique bronze facade. The reason: a dark "antique" surface on the metal was wanted, and the sulphur in Sultex reacted nicely with the bronze to give the desired effect of age!

NEW PRODUCT NEWS

New tool joint compound resists pressure used in joining pipes, and joints can be broken without using much more torque than was applied in making them up. Primarily for use in oil fields. Makes an excellent thread lubricant anywhere where cost is a big consideration.

Lube facts to be aired for metal-working plants

The story of many of the less common, "odds and ends" lubricants used in metalworking will be told in the July issue of "Lubrication" magazine. The editors plan to discuss roll oils (both ferrous and non-ferrous), lubricants for hot punching, deep press drawing, wire drawing and the like. To be sure you're on the list to get this important issue, mail coupon.

Clip Coupon To Company Letterhead

TEXACO INC., Dept. S-LN-21

135 East 42nd Street
New York 17, N. Y.

Dear Sirs:

☐ I am interested in seeing "Shear Magic".

I would like a free copy of

☐ Lubrication Magazine

☐ Management Practices that Control Costs via Organized Lubrication.

Name _____ Title _____

Firm _____

Address _____

City _____ State _____

Which of these did you use today?

Alarm wake you this morning? Stove timer work all right? Did you drive to work . . . take a business trip by air . . . press a light switch . . . use a dictating machine . . . or home workshop motor? Then you, or someone in your home or business, used a spring. With a product-mix like this it's practically certain that we enter your daily living, tucked anonymously away in nationally known and respected brands of all sorts of articles.

Write for a copy of "How to Solve Your Spring Design Problems" to learn how early consultation with the spring manufacturer results in improved design and performance.

Associated Spring Corporation

General Offices: Bristol, Connecticut

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BEND YOUR PROFIT CURVE UPWARD WITH "BUFFALO" BENDING ROLLS

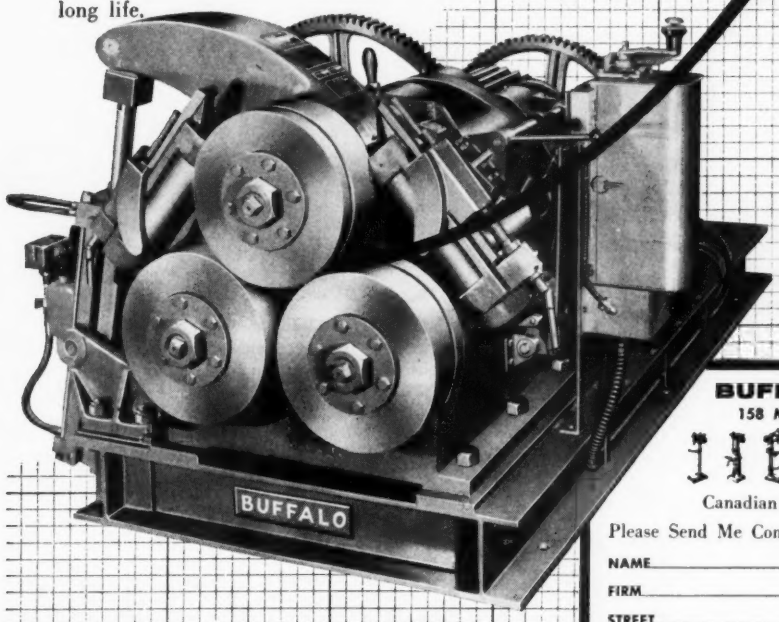
"Buffalo" Bending Rolls will cut costs, increase profits in your production bending operations because they're *fast, versatile, accurate.* Satisfied users report faster, higher quality output with fewer rejects.

Hundreds of shops, large and small, use them for rapid bending of circles, segments and spirals. Angles, rounds, squares, tubes, beams, channels, flats and many special shapes are handled with ease. Quick, easy roll changing for different structural shapes and sizes. Valuable setup time is saved by the "Buffalo" hydraulic top roll adjustment. With this, the upper roll is easily positioned or released in seconds.

Helping to speed operations is the exclusive "Buffalo" "Leg-In" Attachment. This simplifies bending of angles leg-in, formerly very difficult. Prevents material from twisting or getting out-of-square; also acts as a gauge when bending a run of circles to the same diameter.

"Buffalo" Bending Rolls are available in a number of sizes to handle all types of work, from small fabrication jobs to the heaviest applications. For full information, use coupon below — or call your "Buffalo" machine tool dealer.

All "Buffalo" Machine Tools bring you the extra "Q" Factor—the built-in QUALITY that provides trouble-free satisfaction and long life.



ESTABLISHED 1877
"Buffalo"
MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY
158 MORTIMER STREET • BUFFALO, N.Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Please Send Me Complete Facts on "Buffalo" Bending Rolls.

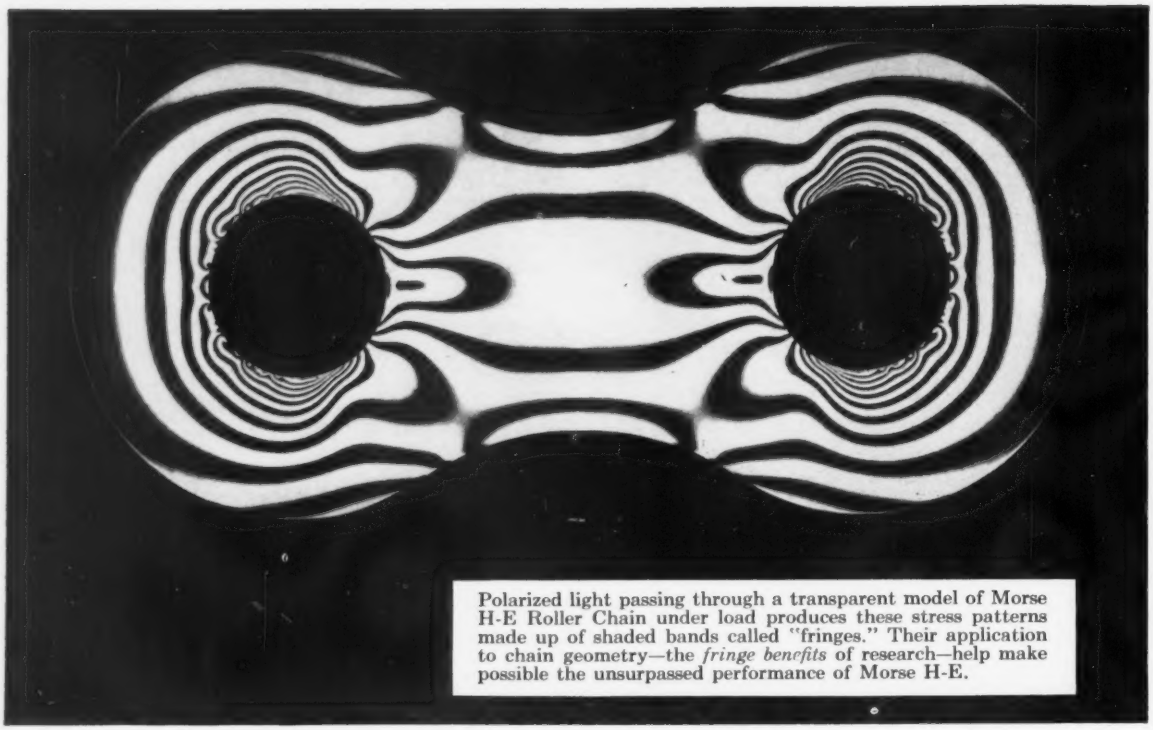
NAME_____ TITLE_____

FIRM_____

STREET_____

CITY_____ ZONE____ STATE_____

DRILLING PUNCHING SHEARING BENDING



Polarized light passing through a transparent model of Morse H-E Roller Chain under load produces these stress patterns made up of shaded bands called "fringes." Their application to chain geometry—the *fringe benefits* of research—help make possible the unsurpassed performance of Morse H-E.

Photoelastic stress study shows . . .

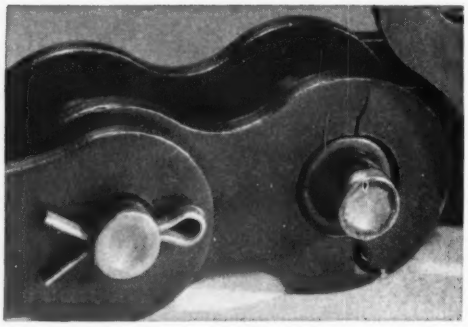
"FRINGE" BENEFITS MAKE MORSE H-E CHAIN LAST UP TO 5 TIMES LONGER!

Improved design . . . special mechanical and metallurgical processes give Morse H-E a 95% higher endurance limit

"Fringes"—the shaded bands which make up photoelastic patterns—show the intensity and distribution of stresses set up in a chain link-plate model under load. Morse engineers first use this knowledge to improve chain geometry. Then Morse production engineers apply advanced mechanical and metallurgical processes to side plates. Result: Morse High-Endurance Roller Chain, with up to 500% longer life under repeated heavy loadings.

Special treatment makes Morse H-E Chain cost about 10% more. Yet it pays for itself many times over in annual savings on replacement costs, lost production time and wasted man-hours.

For full information on research-developed Morse High-Endurance Roller Chain, write: Morse Chain Company, Dept. 2-79, Ithaca, N. Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.



ORDINARY CHAIN BREAKS when the side plate tires from repetitive loading and unloading during the cycle around the sprockets. But Morse H-E Roller Chain has a 95% higher endurance limit . . . outlasts ordinary chain by up to 5 to 1 under repeated loading.

MORSE

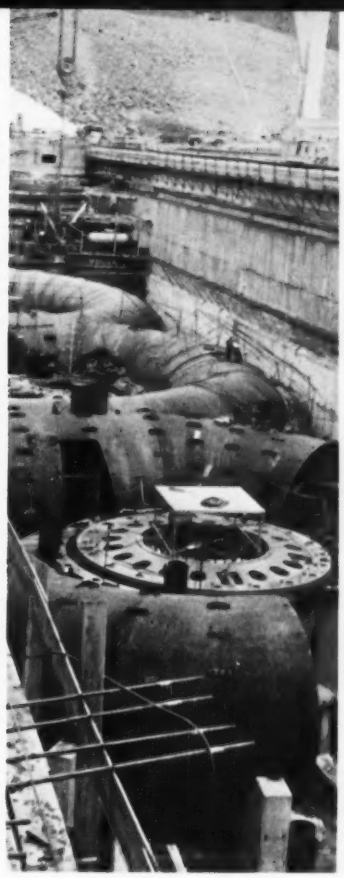
MORSE B-W BORG-WARNER *

*Trademark

A BORG-WARNER INDUSTRY

ONLY MORSE OFFERS ALL FOUR: Roller Chain, Silent Chain, Hy-Vo® and "Timing"® Belts

Owner: The Washington Water Power Company • Engineering: Ebasco Services, Inc.
Scroll cases: Chicago Bridge & Iron Co. • General contractor: Morrison-Knudsen Co. • Turbines: Allis-Chalmers Co.



Good fabrication and welding properties of "T-1" Steel saved time and money in the shop and on location.

◀ **24 feet in diameter**—among the nation's largest turbine scroll cases. Built with USS "T-1" Steel for maximum strength with least weight.

Big turbine scroll cases built 50% lighter with USS "T-1" Steel

A turbine scroll case looks like a giant seashell. Through the conch, water gushes in an ever-tightening spiral into the blades of the water turbine. Pressures are enormous.

Four of these cases, among the largest in the United States, have been fabricated from USS "T-1" Constructional Alloy Steel by the Chicago Bridge & Iron Company. They will harness the flow of the Clark Fork River in the Noxon Rapids Dam, a project of the Washington Water Power Company.

USS "T-1" Steel was used for the cases because of its high minimum yield strength of 90,000 psi. (100,000 psi for non-code applications.) This permitted a reduction in plate thickness of about 50% with sizeable savings in welding costs, freight and foundation costs. Welding on the job was readily done and there was no need for stress relieving.

What USS "T-1" Steel can do for you.

USS "T-1" Steel is an extra strong, tough, weldable steel with high resistance to impact abrasion and corrosion. Both mobile and stationary equipment can be built bigger, stronger and more durable. Payloads can be increased and operating costs drastically reduced. Your products are worth more because they do more and save more when built of USS "T-1" Steel. For information about USS "T-1" Steel, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and "T-1" are registered trademarks

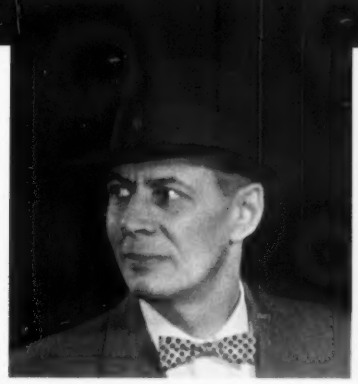
United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

United States Steel

USS

Down go back-up roll costs with

USS Quality Forged Sleeves



PICTURED ABOVE is James S. Rennick, a metallurgist with twenty years' experience in the Forgings Division of U. S. Steel. Jim specifies composition, heat treatment, and other processing procedures essential to the production of assemblies as shown in the main picture—a back-up roll that will be used in the cold reduction tin mill at U. S. Steel's Gary, Indiana plant.

This job points up a curious situation: U. S. Steel is one of the country's leading manufacturers of rolls, and also one of the biggest *users* of rolls . . . a double reason to perfect their performance and reduce their cost . . . just as we did here.

We had to replace a worn, cast steel back-up roll. Rather than replace the entire roll, we machined the face of the roll and shrunk on a *forged* steel sleeve. For back-up rolls like this one, 42" O.D. and larger, this method of sleeving is much less expensive than buying a complete new roll. One arbor can be used for several forged sleeves. A forged sleeve has a hard, wear-resistant surface and is highly resistant to spalling.

Also, the sleeve is purposely produced with a softer bore to develop a desirable stress pattern, and to provide maximum gripping between the arbor and sleeve after assembly.

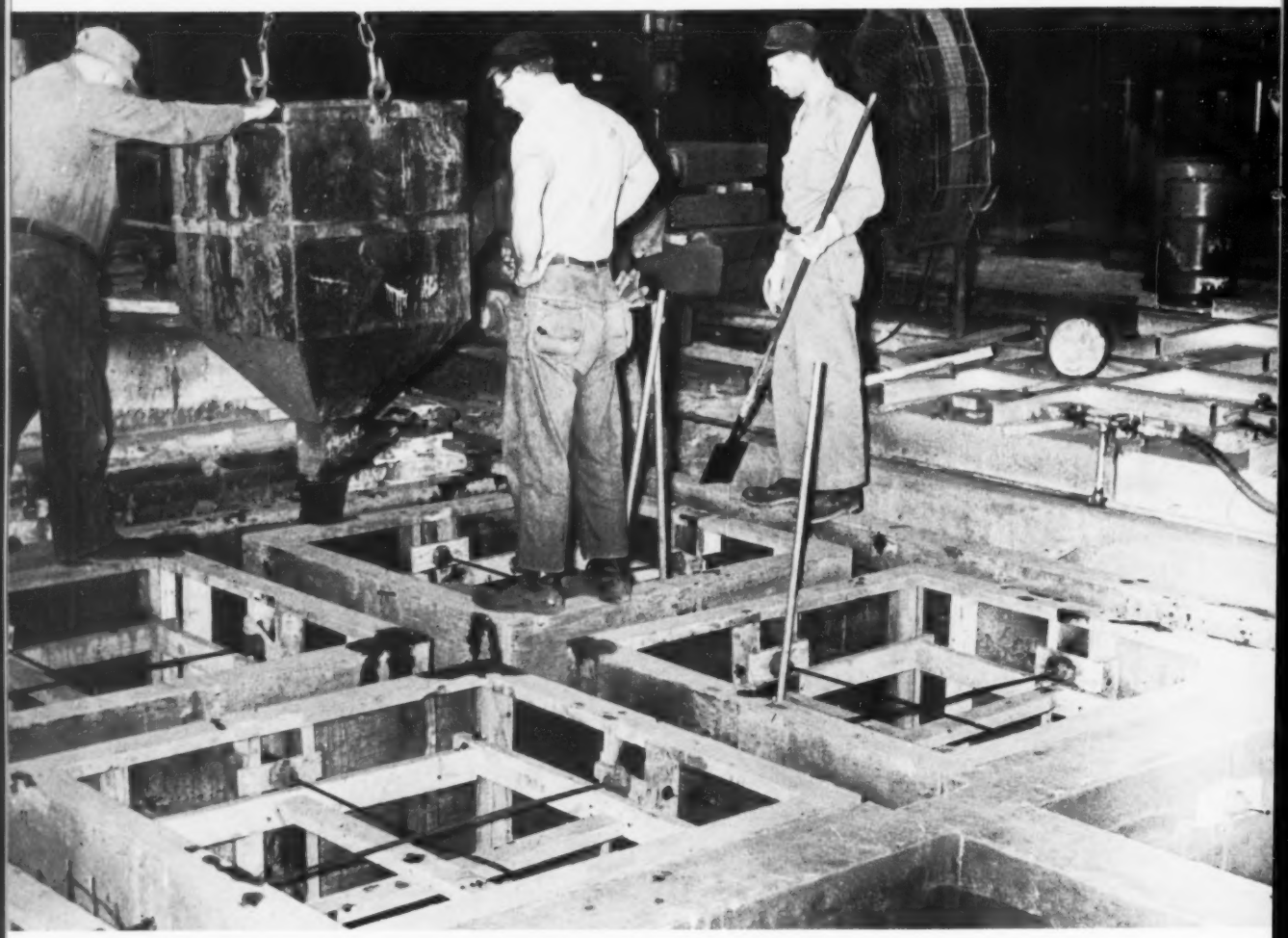
There is a good possibility that we can help reduce *your* roll costs. Write or call the United States Steel Office nearest you, or United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

Slow-cooling pits cost less to build with refractory concrete made with Atlas Lumnite Cement



Vanadium-Alloys Steel Company, Latrobe, Pennsylvania, saved time and money by constructing slow-cooling pits with refractory concrete made with Lumnite calcium-aluminate cement. Using plant labor, 24 refractory concrete pits were formed in record time. With re-usable wood forms, material costs were greatly reduced. And procedures and equipment typical of any standard concrete construction work helped speed the job. The result was a smooth, jointless concrete pit that will resist thermal shock and wear and tear of charging and unloading hot alloy ingots.

For added convenience and economy in refractory concrete construction, castables made with Lumnite cement are available. These are packaged mixtures, ready for use. Simply add water, mix and place. Made by leading manufacturers of refractories. For more information, write Universal Atlas, 100 Park Avenue, New York 17, N. Y.

"USS," "Atlas" and "Lumnite" are registered trademarks

L-180

Universal Atlas Cement
Division of
United States Steel

OFFICES: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

News! The best features of
modern bearing design combined and refined in

Spherical

SELF-ALIGNING ROLLER BEARINGS BY LINK-BELT

BIG, mirror-smooth convex rollers *plus* heavy, broad-shouldered inner race *plus* centrifugally-cast bronze, precision-machined retainers! Only from Link-Belt do you get ALL that is best in modern bearing design.

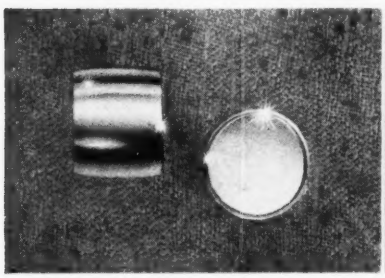
Individually, these elements represent major improvements on accepted design concepts. Collectively, they constitute the most efficient spherical roller bearings available . . . promise unequalled economies, whatever the application.

Your Link-Belt office or authorized stock-carrying distributor will gladly explain the many performance advantages evolved with this new design. And either can furnish full data on industry's most complete line of ball and roller bearings . . . pillow blocks and flanged, flanged-cartridge, cartridge and take-up blocks.

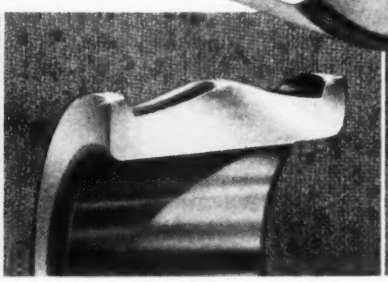
LINK-BELT

MANUFACTURERS OF SELF-ALIGNING BALL AND ROLLER BEARINGS

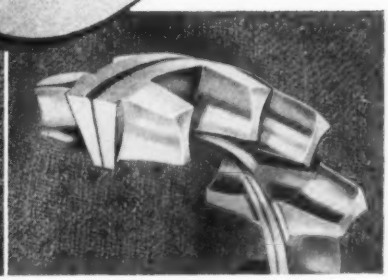
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. Plants, Sales Offices and Distributors in All Principal Cities. 14,819



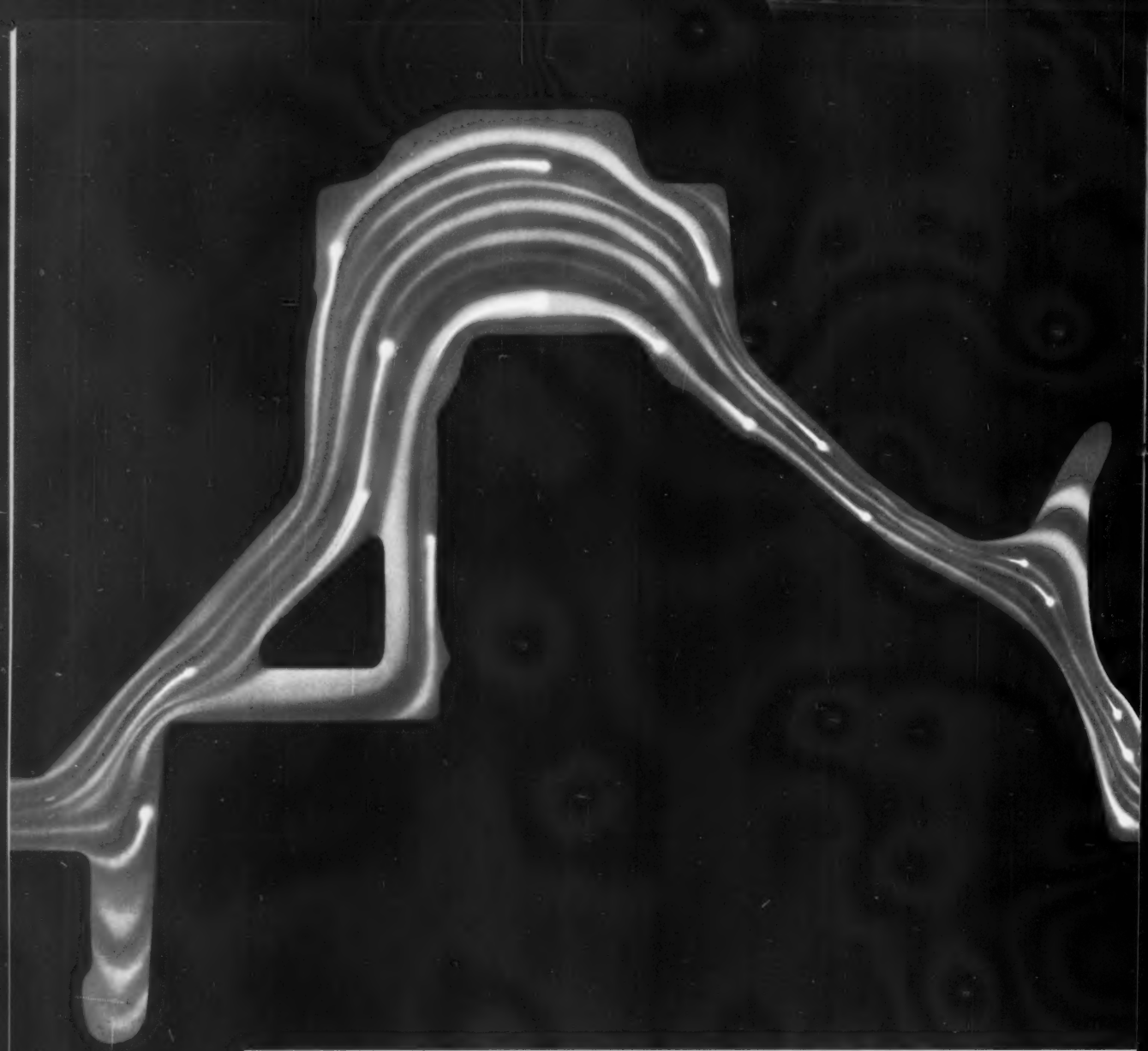
BIG, HIGHEST-CAPACITY ROLLERS. Each bearing has a maximum number of rollers—as large as possible, yet all components are in optimum balance.



HIGH, HEAVY INNER RACE FLANGES present convenient hold for assembly and removal of bearing without cutting away shaft, avoid any need to skimp on shaft shoulders.



PRECISION-MACHINED, CENTRIFUGALLY-CAST BRONZE RETAINERS have many times more support and ability to withstand high stress. They are not stampings. Design assures maximum bearing efficiency.



Fluid mapper pattern demonstrating liquid flow through a cross section of a Malleable differential carrier.

Versatility is Malleable

The ability to do most any job well is synonymous with Malleable iron castings. The variety of tasks they perform, from the commonplace to the spectacular, is legend. The strength and toughness . . . the freedom of design . . . the wide range of shapes and sizes . . . the excellent machinability . . . the economies achieved . . . all these advantages of Malleable combine to create an unexcelled reputation for versatility.

Whatever your needs, look first to Malleable.

For information or service, call on one of the progressive firms that identify themselves with this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.

Versatility Is Key to Malleable's Increasing Use

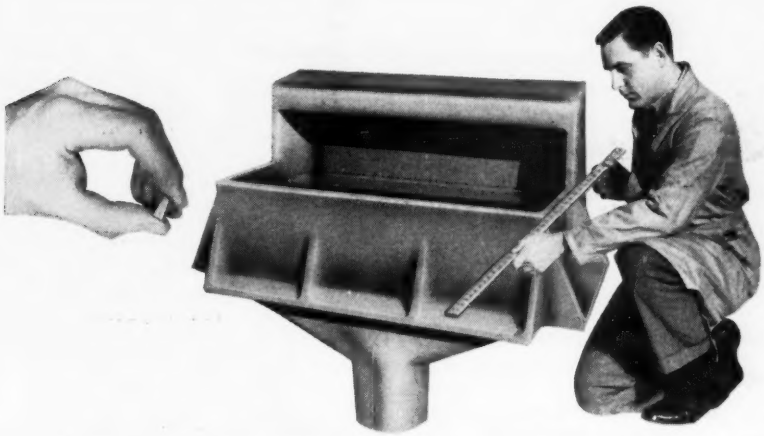
Recent metallurgical advances have made the Malleable irons a family of metals uniquely capable of meeting the most diverse design, production and performance requirements. Whether the vital consideration is high strength, toughness, ductility, hardness, machinability, high or low temperature performance, wear resistance, or economy and adaptability for complicated designs, Malleable castings have the versatility to meet exacting specifications.

For versatility of shape, the casting process is unexcelled. It permits direct production of the most complicated components. The metal is placed exactly where it is needed regardless of the intricacy of the design.

The capabilities of the metal to be cast are of even greater significance, for every application has a different set of requirements. Here, Malleable iron provides unique opportunities to obtain better parts at less cost.

Holes can be punched in Malleable, surfaces can be coined to meet rigid specifications. The pearlitic Malleables can be surface-hardened for even better wear resistance. These and other advantages make today's Malleable iron one of the most versatile engineering materials available.

Although Malleable iron's properties are flexible, depending on service requirements, certain relationships remain constant. Malleable provides more strength and toughness per dollar than any other metal. It is also the most machinable of all ferrous metals of similar properties.



Malleable castings can be produced in sizes ranging from the hammer handle wedge, shown here, weighing less than an ounce, to the 1,125 pound bridge scupper. Throughout this range is an endless variety of castings, best made of Malleable for highest quality at lowest cost.

Shapes and sizes of Malleable castings are virtually limitless. The combination of Malleable's good castability with modern production techniques regularly results in sections as thin as 1/16" and tolerances of ±.005" per inch in sections of 1", with excellent surface finishes.

Engineering Aids Available

While the design of Malleable castings is not complicated, it will pay you to consult a skilled Malleable engineer who can offer time and cost saving suggestions for the production of better parts. As another aid to basic Malleable casting design, a special folder — *Data Unit 104 — Design Versatility* — is available from any member of the Malleable Castings Council and from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

These companies are members of the

MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
Muncie Malleable Foundry Co., Muncie
Terre Haute Mall. & Mfg. Corp., Terre Haute

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
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Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW JERSEY
Meeker Foundry Company, Newark 4

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Canton Malleable Iron Co., Canton 5
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
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Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
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New Star Performer In The Sandvik Line

SANDVIK

Presents A SUPER SPRING STEEL

Sandvik's new 2R25 is a superior grade of stainless spring steel which goes far beyond the capabilities of ordinary spring steels. It was developed for applications where performance outranks cost.

This new steel is a prime example of Sandvik's ability to combine several advantageous properties in one metal.

Sandvik 2R25 is exceptionally tough and resilient, much more formable than hardened and tempered steel, has up to 10 times the fatigue life of ordinary carbon spring steel and has excellent corrosion resistance under varying atmospheric conditions.

Mechanical Data on 2R25 —

TENSILE STRENGTH RANGE — Hard Rolled 242,000 • 270,000 or 299,000 PSI
Heat Treated 270,000 • 299,000 or 327,000 PSI

ELASTIC LIMIT (.01% Proof Stress) — From 156,000 to 192,000 PSI according to size and finish

MODULUS OF ELASTICITY — 27.7 to 35.6 x 10^6 PSI according to size and finish

SIZES (with extremely close tolerances)
Thickness — .0016" to .035"
Width — .039" to 3.94"

For further information on Sandvik 2R25, contact your nearest Sandvik office

Sandvik stocks a wide variety of qualities and sizes of cold rolled specialty strip steels. In addition Sandvik has rolling, slitting, edge-filing and hardening and tempering facilities. *Send for your copy of this free brochure* which gives specific data on the leading types of Sandvik steels.

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SANDVIK CANADIAN LTD. P.O. Drawer 1335, Sta. O. Montreal 9, P. Q.
***Works:* Sandviken, Sweden**

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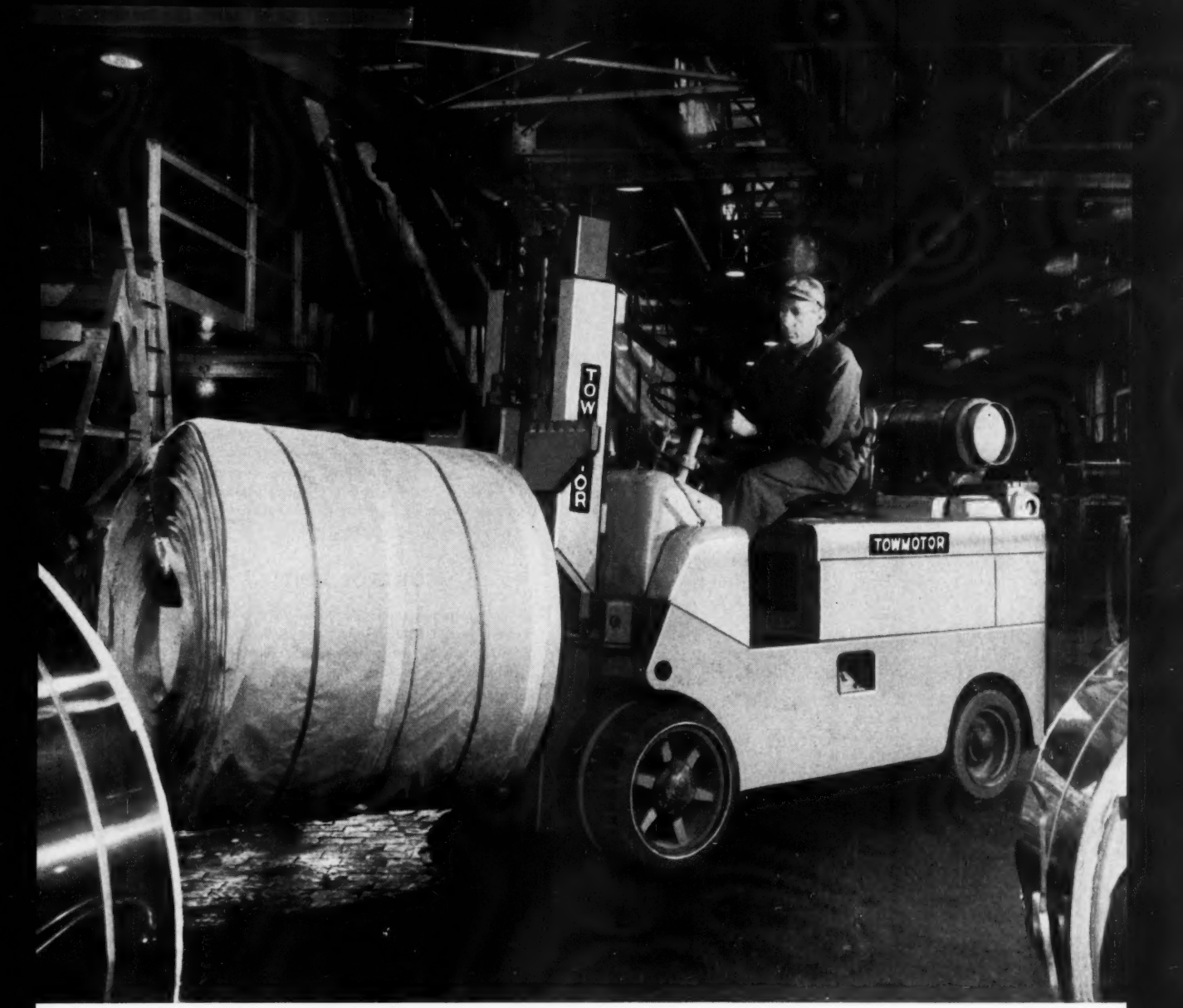

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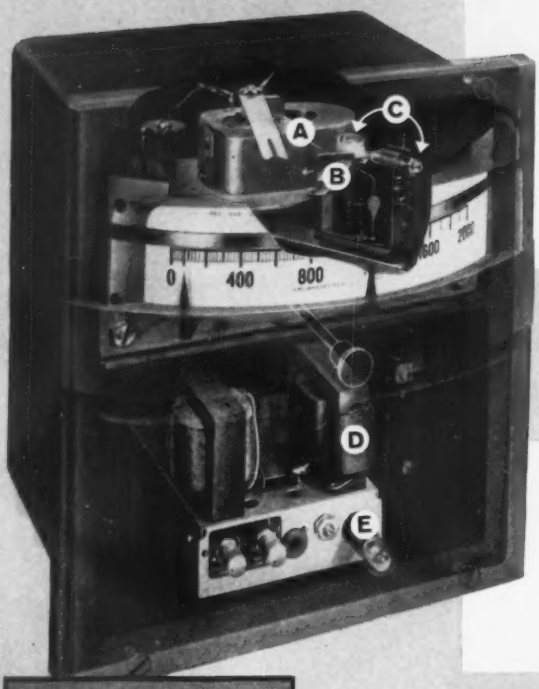


MEASURING UNIT

A. A thermocouple signal to a d'Arsonval galvanometer, the only moving part, moves the indicating pointer up scale.

B. Aluminum vane adjusts the amount of light received by the photocell from the operating lamp.

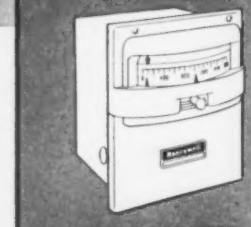
C. If operating lamp or photocell fails, output voltage assumes a value equal to high temperature.

***Pyr-O-Volt* has built-in voltage regulator to maintain voltage within ± 1% of level required for maximum operating stability. Spare operating lamp supplied. Thermocouple burnout protection optional. Available in horizontal and vertical case.**

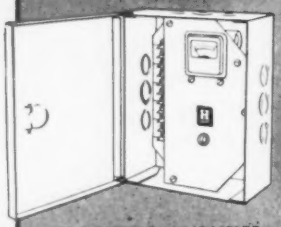
CONTROL UNIT

D. A one-stage magnetic amplifier amplifies small current from the photocell in the measuring unit. This is the only active electronic element in the controller.

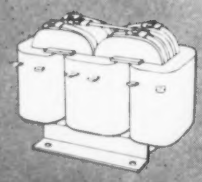
E. Pilot light goes out on line power failure.



MILLIVOLTMETER CONTROLLER



MAGNETIC AMPLIFIER



SATURABLE REACTOR

For your electric heating applications . . .

Use this accurate, dependable *Pyr-O-Volt** controller

- **No tubes to wear out**
- **Voltage regulation**
- **Fail-safe design**
- **Contactless, stepless control**

Here's an accurate instrument for reliable stepless control of saturable reactors, r.f. generators and other power amplifiers. It has a proportional band adjustable from 2/3% to 5%, and a manual reset adjustment which shifts the control point over 100% of the proportional band.

The *Pyr-O-Volt* controller can control saturable core reactors up to 100 kva, if used with a Brown magnetic amplifier. You can also use this proportional output millivoltmeter-controller with the General Electric *Reactrol***, and with the Westinghouse *Furnatron*.*** Complete packaged systems available.

Contact your nearby Honeywell field engineer for complete details. He's as near as your phone.

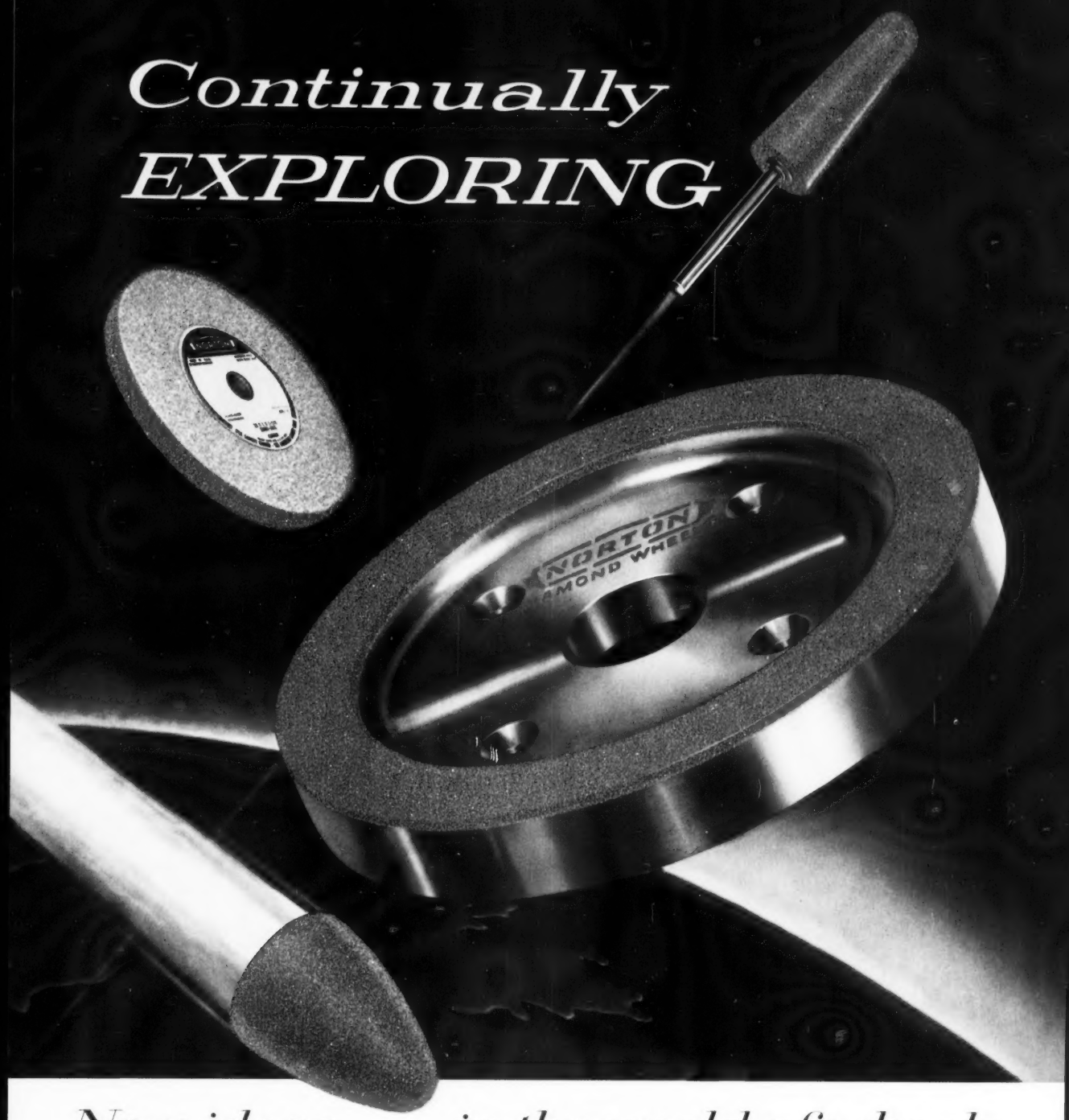
MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Phila. 44, Pa.

Honeywell

*Tradename, Minneapolis-Honeywell Regulator Co.
**Tradename, General Electric Co.
***Tradename, Westinghouse Electric Corp.

H HONEYWELL

First in Control



New ideas in the world of wheels

Norton abrasives are constantly reaching new heights of "Touch of Gold" performance, improving products and reducing grinding costs every time they go into action.

Call your Norton Man

After thorough training at the Norton plant, your Norton Man has had long practical experience as a consulting specialist on the widest range of grinding operations.

He'll give you expert advice on the selection, use and care of grinding wheels. He's ready to supervise complete wheel testing whenever necessary. And, if needed, he'll make a free Abrasive Requirement Study in your plant — listing the correct specifications for each abrasive job to assure you the lowest cost-per-piece ground.

HE'S BACKED BY . . .

The World's Most Complete Line. Norton abrasive products — grinding wheels, segments, bricks, sticks, mounted wheels, abrasive for barrel-finishing, grain for polishing and blasting — are designed to cover all abrasive operations, ranging from

heaviest stock removal to the most delicate precision finishing. Norton grinding wheels are made in exactly the right types and sizes to bring you the value-adding, cost-cutting "Touch of Gold."

Great New Discoveries. Over 190 Norton scientists and technicians, in many specialized laboratories, are using the latest equipment for research, development and testing of more efficient, more economical abrasives and abrasive products. Latest discoveries from this center of abrasive progress include 44 ALUNDUM

abrasive, three outstanding grinding wheel bonds—G, K and R50—metal-mounting of mounted wheels, miniature mounted wheels and SD diamond wheels, using man-made diamonds.

Fastest Possible Deliveries. Besides immense factory stocks at Worcester and Santa Clara, California, Norton maintains huge warehouse stocks in five conveniently located cities. And Norton distributors, in 283 cities, keep their stocks fully adequate to meet the needs of their areas. For prompt deliveries — extra fast in emergencies — plus helpful service, your Norton distributor is as near as your phone.

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*Warehouse Facilities and Stocks at this location

BEHR-MANNING CO., Troy, N.Y. is a Division of Norton Company

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NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

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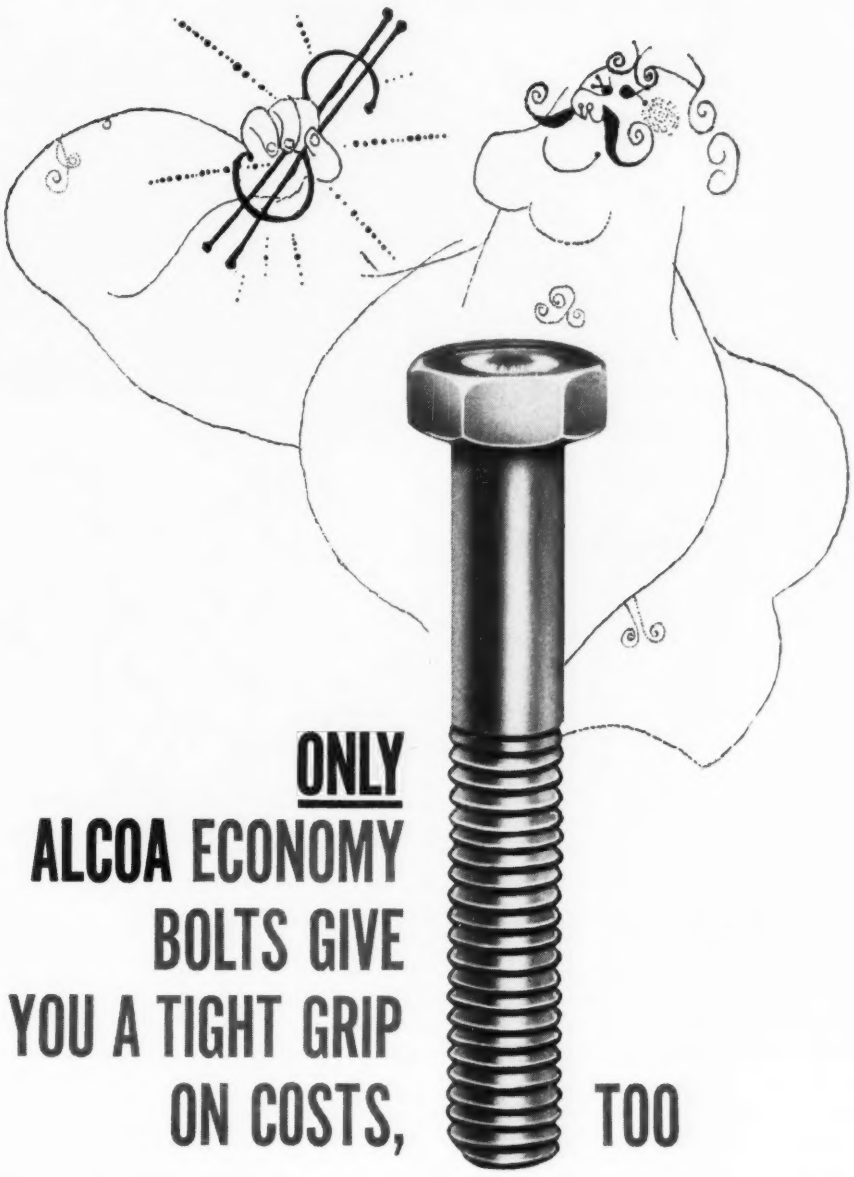

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If you want to get tight-fisted about fastener costs . . . without sacrificing product quality . . . better turn to Alcoa® Aluminum economy bolts. Bright and flawlessly finished, they cost less than any other corrosion-resistant fastener. Order them for practically any general application where you now use more expensive trimmed-head bolts. They'll add extra sales appeal to your product *at no extra cost.*

Made to American Standards specifications, they conform to dimensional and tolerance standards for regular hexagon-head bolts. And, remember, you get *full* count, *full* quality when you specify Alcoa Aluminum Fasteners.

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ONE SANDUSKY CENTRIFUGAL CASTING ...makes 4 giant stator shells

Specified by Westinghouse for 4 canned motor pumps soon to be integral parts of reactor system in Yankee Atomic Electric Plant in Rowe, Massachusetts

One king-size 17-ton Sandusky casting supplied the main motor bodies (stator shells) for the four pumps being built by Westinghouse, each to handle 23,600 g.p.m. of pressurized water through the reactor core.

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These stator shells represent another *new and exacting application* for Sandusky Centrifugal Castings—which may offer a practical and economical answer to *your* cylindrical requirements also. They are available in diameters from 7″ to 54″—in lengths up to 33 feet—in heat- and corrosion-resistant stainless, carbon and low-alloy steels and a wide range of copper-base and nickel-base alloys.

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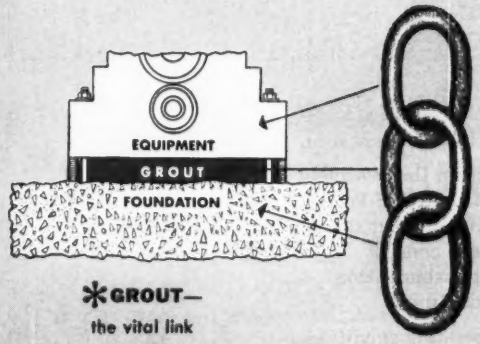
SANDUSKY, OHIO Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

. . . to withstand: **IMPACT • POUNDING ACTION • VIBRATION • SIDE THRUST • TORQUE**



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the vital link
between equipment
and foundation

LEFT PHOTO... *Plain Grout* shrinks and leaves only a web of mortar and a small shim area to support bedplate . . . results in a *short-life* grout which causes costly shutdowns, possible equipment damage, and loss of production.

RIGHT PHOTO—*Embeco Non-Shrink Grout*. . . provides full bedplate support, maintains alignment and has high impact resistance . . . is a long-life grout that avoids trouble and cost of untimely re-grouting.

Full information on Embeco Pre-Mixed Grout and "Grouting Specifications"—a valuable guide on machinery and equipment grouting—on request.

The Master Builders Company, Division of American-Marietta Company. General offices: Cleveland 3, Ohio and Toronto 9, Ontario. International Sales Department: The Lincoln Bldg., New York 17, N. Y. • Branch offices in all principal cities—Cable: Mastmethod, New York.

MASTER BUILDERS®
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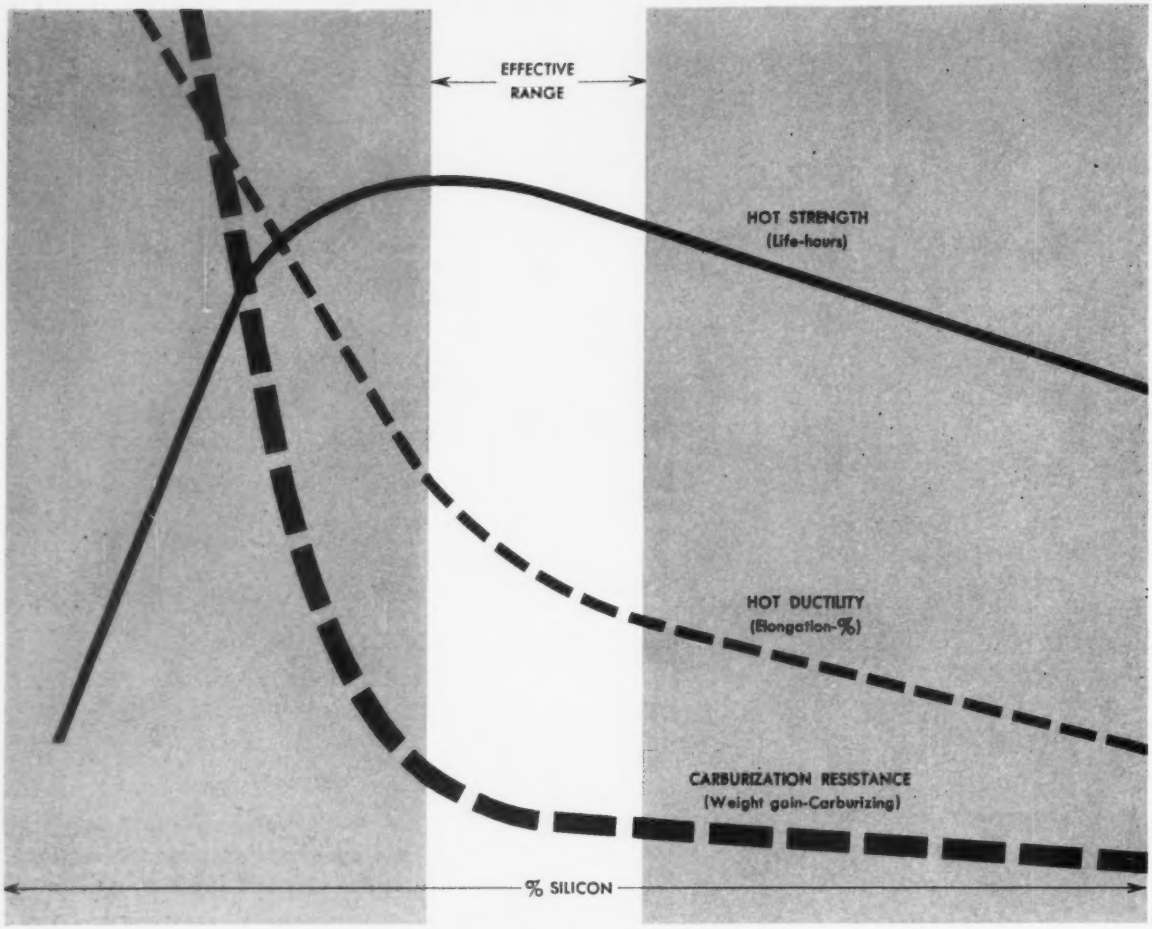

How to use

SILICON-CONTENT

to lengthen the life of heat-resistant castings

Silicon content can be used to give heat-resistant alloy castings higher hot strength, higher hot ductility and higher carburization resistance.

But these property refinements are possible only within the relatively narrow *effective range* of silicon content shown on the graph. Silicon content lower than the effective range would result in a higher rate of carburization and low hot strength. Conversely, silicon content above the effective range, while it provides excellent carburization resistance, produces low hot strength and poor hot ductility.

The effective range of silicon content varies with operating conditions. Electro-Alloys' metallurgical research has defined a number of ranges to deal with these varying conditions.

To insure proper silicon content and the accurate balance of all alloying elements, consult us at the initial stages of product development. Electro-Alloys Division, 1027 Taylor Street, Elyria, Ohio.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION • Elyria, Ohio

Quality . . . the best economy of all

He does a better job when he can see what he's doing

You increase operator efficiency as well as production when you use transparent, heavy-duty Sunicut cutting oils. Operators work better, because Sunicut oils let them see tools and workpieces, see the finish, see micrometer graduations.

Sunicut oils don't stain hands and clothing. They pump easily, wet metal fast, and give excellent extreme-pressure lubrication.

To prove to yourself the economy of Sun quality, ask your Sun representative to help you select the right grade of Sunicut for your heavy-duty cutting requirements. Or write to SUN OIL COMPANY, Dept. I-13, Philadelphia 3, Pa.

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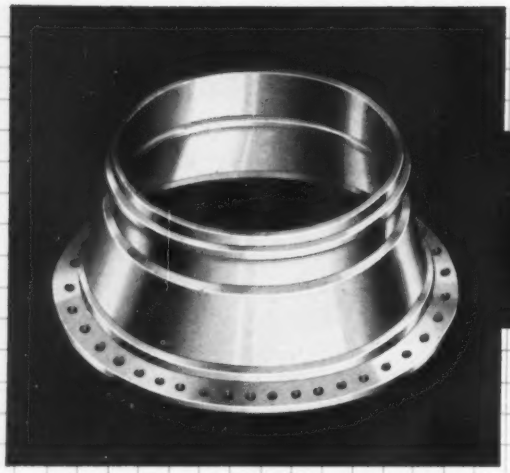
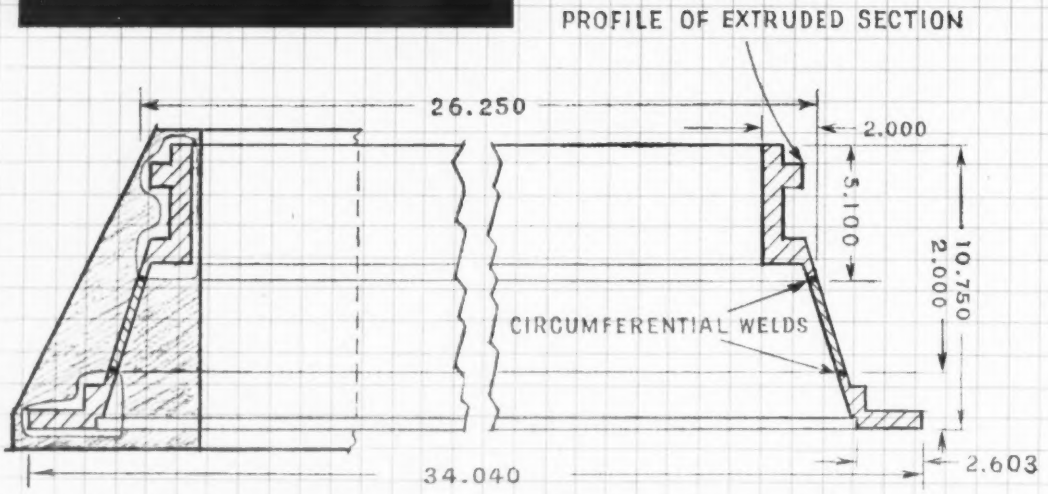


Saved 862 lbs. of A-286
Saved $3530.00



AS FORMERLY PRODUCED, WOULD REQUIRE 1091 LBS. OF A-286

USING FLASH BUTT-WELDED RINGS REQUIRE ONLY 229 LBS. OF MATERIAL

Flash Butt-Welded Rings Reduce Excess Stock
SAVE $3530.00 each on Shroud Nozzle Support in Pilot Run

Where expensive metals are involved, dramatic savings are often accomplished by combining several flash butt-welded rings into a single complicated assembly. In addition to the pounds of material saved, hours of costly machining required to remove this excess metal are eliminated.

With experience and know-how gained from working high-strength, high-temperature alloys, Amweld engineers and metallurgists frequently suggest fabricating techniques to solve tricky problems—and reduce manufacturing costs.

Amweld's extensive know-how in welding, forming, and machining of welded products and assemblies is available to you. Write or call today. We will be glad to study your problem and to provide subcontracting service on prototype or production orders.

GET THE FACTS ABOUT AMERICAN WELDING

Complete information. Facilities brochure, Precision Assemblies Catalog, and booklet on "How Flash Butt-Welded Rings are Made."

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD • WARREN, OHIO

AMERICAN WELDING

July 27, 1959

The Real Issue in the Steel Strike

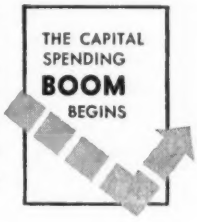
Positions taken by both sides in the steel labor dispute signal a new era in collective bargaining—an era in which the key issue will not be wages, nor fringes, but the determination of the question: Which group will control the operating policies of the companies? (Page 69.) Labor, after several decades of chewing away management's former prerogatives, is battling to hold its entrenched position. Management, faced with waste and inefficiency that could cause it to lose markets to foreign competition and competitive materials, is standing firm on its attitude of "no wage increases without changes in local practice clauses." Probable result: A long strike.

BDSA Checks Warehouse Stocks of Defense Steels

Robert G. Welch, executive vice president, American Steel Warehouse Association, and four major service center operators met with officials of the Business & Defense Services Administration last week to set up a lookout program for defense steels during the strike. The service center people will make a weekly report to BDSA on the status of steel stocks used in defense programs. They reportedly assured BDSA that current stocks are adequate.

Steelmakers Boost Equipment Spending Plans

Steelmakers will boost their order rates for new equipment despite the strike. A STEEL survey of the companies that represent 60 per cent of the industry's steelmaking capacity shows that second half, 1959, orders for steel plant equipment will be worth 43 per cent more than first half orders (Page 74). Suppliers say inquiries and quotations are high. (This article is part of STEEL's new capital spending forecast series.)



49th State Has Steel Mill

The first step toward a steel industry in Alaska was officially taken July 20, when Alaska Steel Mills Inc., Seattle, went into production. The mill will be moved to Fairbanks, Alaska, when adequate power facilities are developed. Daily capacity: 100 tons. It makes reinforcing steel for the construction industry in Alaska and the Northwest and is not strikebound. The company will eventually expand its product line.

Automakers to Set Building Block Standards

Building block standards for machine tools will be formally adopted by all major automakers before fall. The standards will permit replacement of one or more sections of a production line with other standard sections to adapt

Technical Outlook—Page 105 Market Outlook—Page 143

the line to production of new designs. Result: Longer useful lives for machine tools. Another effect of the practice will be the use of automation in areas where it would not have been economically feasible heretofore. Nearly all machine tool builders who sell to the auto industry will have to redesign to meet the new standards. That's expensive and will probably mean higher machine tool prices. For many builders, it will be a matter of backs-to-the-wall co-operation. It also takes time—perhaps nine months—so the carmakers apparently won't request tooling to the new standards until they start ordering for the '61 models. Some companies outside the auto industry are expected to adopt the standards too. International Harvester, for example, assisted in their development.

Jim Carey Has a Countermove

The peppery president of the International Union of Electrical, Radio & Machine Workers is an old hand at the type of bargaining which the USW is running into now: Management agrees on a position beforehand and sticks to it. Mr. Carey's answer: Appoint impartial fact finding committees to spell out areas of friction before negotiations begin. STEEL asked Mr. Carey his plans for the IUE (Page 71) in the first article of a new series.

Consumers Are More Bullish

The University of Michigan's latest survey of consumer attitudes and inclinations to buy points to an upturn in consumer durable goods purchases. About 4 in 10 families have higher incomes than a year ago. Many more look forward confidently to good times in the coming year, but a few more than in 1956 have some reservations about the short term business outlook. The belief that prosperity tends to be interrupted by occasional recessions is gaining ground. A great many people figure now is a good time to buy houses and an increasing number think it's a good time to buy appliances and cars. Many are becoming accustomed to prices that were formerly considered too high.

Metalmen Face Record Problems

This forlorn fellow with empty pockets signifies a condition common in metalworking today. The industry faces record problems—in size and severity—that rob the till of profits (Page 76). A STEEL survey of 6000 plant managers finds that most metalworking executives believe price competition is their No. 1 problem. Pressure for wage increases is listed as No. 2. Foreign competition and the need for tax reform are growing in severity.

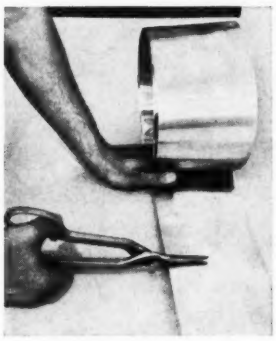
Successful Manager Will Change His Emphasis

"The human relations era of company management is over," contends Ralph H. Heywood, Chicago organization specialist. Today's successful executive thinks less about being the head of "one big, happy family" and more about solving productivity problems, asserts Mr. Heywood. He says production costs have risen twice as fast as productivity. It means managers must direct their attention, not at the person, but at the point in a job where the way it is done directly affects other jobs, he says.

Debt Payments to Pre-empt Tax Cut

President Eisenhower says the country must start paying off its national debt before any tax cut is possible. Fiscal '61 interest on the debt will be $8.7 billion. Debt reduction would give the country the confidence that would make a tax cut possible, the President contends.

This Is Metal Tubing



You'll soon be able to buy thin-wall seamless tubing in ribbon form and inflate it at the point of use. To be put into experimental production this fall by Calumet & Hecla's Wolverine Tube Div., Allen Park, Mich., the new design could revolutionize many fabricating methods. Its impact may be felt in industries as diverse as construction, electric power distribution, rockets and missiles, farming, chemicals, communications, and general manufacturing. It can have foil-thin or standard walls (Page 106).

GNP Hits Record

Gross National Product hit a record pace of $482 billion yearly in the second quarter, government experts indicate. That's a $12 billion gain in three months to exceed even the most optimistic expectations.

No 'White Sale' in Turbines

Sizable price cuts on turbines by General Electric Co. and Westinghouse Electric Corp. won't precipitate a 'white sale.' Price competition was already intense and the effect of the reduction will probably be to firm up prices at the new published levels. The cuts were made to recognize potential economies made possible by new technological developments, the companies say.

Stainless to Conquer Sink Market

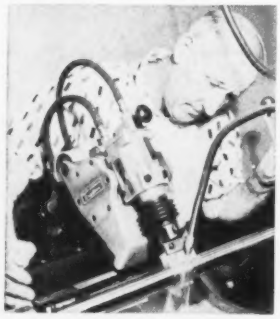
Seven in ten new homes will have stainless steel sinks by 1970, reveals a survey of fabricators conducted by Allegheny Ludlum Steel Corp. More than 20,000 tons of stainless will go into that market by then (vs. less than 4000 tons last year), the steelmaker estimates. Of 2.2 million sinks made last year,

METALWORKING OUTLOOK

285,619 were stainless. The switch from welding to drawing in sink fabrication has saved enough time and labor to make stainless competitive for the application, fabricators report. Stainless sinks are now taking a lead in the replacement market which will account for 90 per cent of it within a decade, the survey shows.

Attachment Caresses Surfaces to Give Fine Finish

Precision surface finishes as fine as 0.5 microinch can be turned out with relative ease and economy by employing a new microstoning process developed by Taft-Peirce Mfg. Co., Woonsocket, R. I. (Page 110). A German-developed machine tool attachment does the job. The process works on a wide variety of materials and can help correct defects in geometry. Stones are pressed lightly against the work and vibrated as the workpiece rotates.



Rail Suppliers Are Rushed

Expect 1959 to be one of the best sales years in history for rail equipment makers. Order backlogs for cars hit 40,973 on July 1—up 4104 in a month. June orders totaled 8054 cars vs. 5253 in May and 317 in June, 1958. At least 2000 more cars were ordered early in July.

'Right to Work' Given New Push

Expect the National Right to Work Committee and its state groups to intensify, rather than give up, the fight to have more right-to-work laws adopted. William T. Harrison, committee president, promises "a more vigorous fight" in his new book, *The Truth About Right to Work Laws*. But labor is taking the offensive to have the laws repealed in some states where they now exist.

Straws in the Wind

Look for the Justice Department to draw up a new and narrower subpoena to serve on General Motors in its antitrust inquiry; Federal Judge McGohey of New York quashed an earlier subpoena . . . Norge Div., Borg-Warner Corp., has cut factory prices 10 to 13 per cent on most new washers and dryers . . . The Small Business Administration has changed its definition of small business in relation to some purchases of aircraft parts so that a firm employing up to 1000 may be able to qualify . . . Top industrialists predict there will be 400,000 new jobs in Australia by 1970 . . . General Motors Corp. plans a $20 million expansion of facilities in Argentina. Goal: Annual assembly of 20,000 trucks there . . . National Steel Corp. has awarded $103 million worth of contracts for plant construction at Ogden Dunes, Ind. . . . The U.S.S. *Lynde D. McCormick*, second of four guided missile destroyers being built at Bay City, Mich., will be launched tomorrow.

RYERSON FOR METALWORKING MACHINERY

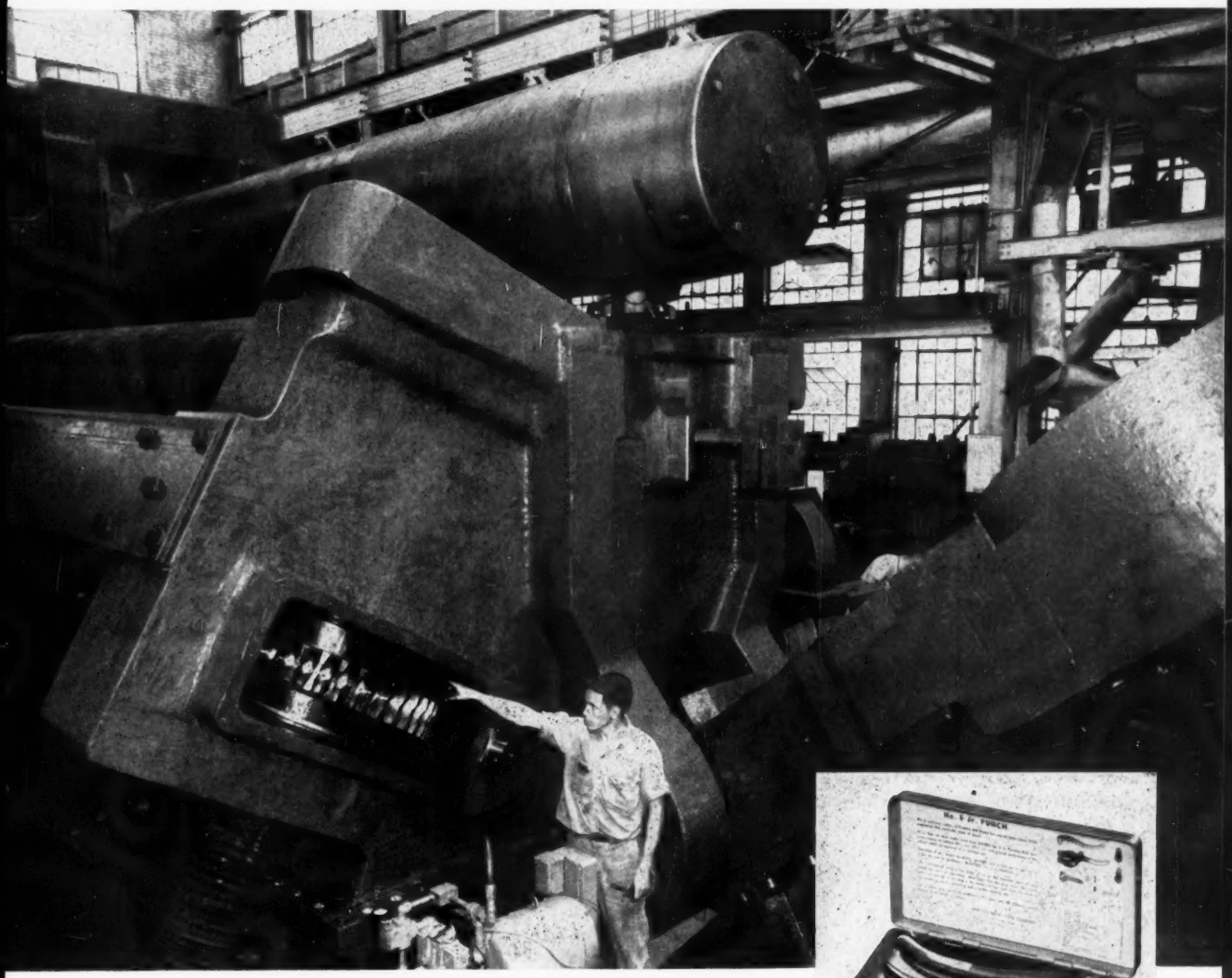
375-ton rolls . . . 7½-lb. punches . . . everything in between

Whatever you need in metalworking machinery Ryerson can supply. Over 3800 types and models are available — everything from this huge bending roll to the little hand punch pictured below.

Ryerson supplies equipment produced by almost a hundred of the nation's top manufacturers—and offers you unbiased recommendations based on the experience of 117 years' service to metal fabricators. In addition, you get a double guarantee of satisfaction and greater continuing interest because of your steel and aluminum buying potential.

So next time you are considering the purchase of new equipment, get in touch with the machinery specialist at your nearby Ryerson plant.

The Ryerson line includes machinery for: bending, braking, drilling, forming, hoisting, pressing, punching, rolling, sawing, shearing, threading and welding. Also a special line of material handling equipment.



MACHINERY DIVISION

RYERSON STEEL®

Member of the INLAND Steel Family

PLANTS AT: NEW YORK · BOSTON · WALLINGFORD, CONN. · PHILADELPHIA · CHARLOTTE · CINCINNATI · CLEVELAND · DETROIT · PITTSBURGH
BUFFALO · INDIANAPOLIS · CHICAGO · MILWAUKEE · ST. LOUIS · DALLAS · HOUSTON · LOS ANGELES · SAN FRANCISCO · SPOKANE · SEATTLE

The Show Will Go On

NO CRYSTAL BALL

Lacking a crystal ball—and under pressure to meet July publication deadlines, we released this ad-message not knowing whether we would or would not be working now.

WORKING?

Assuming, hopefully, that we are working now—we are first cleaning up any June backlog, then proceeding with orders scheduled for July.

The June balances wouldn't have amounted to much percentage-wise anyhow because we didn't overbook orders nor pyramid promises. Some June steel was delayed as a result of production setbacks, due chiefly to minor breakdowns from pushing our equipment to extremes. Customers affected were notified immediately.

SHUT DOWN?

Assuming that we *are* shut down now—there's nothing to do except wait for a contract settlement, hoping it might come quickly.

LOOKING AHEAD

As matters stand we are booked solid for July. August and September are substantially spoken for, and some customers are coming in already with their fourth quarter specifications.

In any event, union-management differences will be resolved in one way or another and *the show will go on.* We expect to be prepared to resume near-capacity operations at our Portsmouth, Detroit and Eastern plants as soon as the all-clear signal is given . . . and to continue to take care of our customers' normal monthly requirements, as always.

MEANWHILE

Strike or no strike, our DSC Customer "Reps" are on the job to help you with yours. For complete information on DSC products and services—or to get your name on our ad-preprint mailing list and receive our brief, informal letters that accompany them monthly—just say the word to our nearest "Rep" or drop us a line to Box 4308, Detroit 9.

Customer Satisfaction—Our No. 1 Job

DSC

Detroit Steel Corporation

General Sales Office, Box 4308, Detroit 9, Michigan

DSC PRODUCTS: Coke . . . . Coal Chemicals . . . . Pig Iron
Basic Open Hearth Steel Ingots, Blooms, Slabs, Billets, Rods
HR and CR Sheet and Strip . . . . . Flat CR Spring Steel
Mfrs.' and H.C. Specialty Wire . . . . . Welded Wire Fabric

The PROOF of DSC STEEL is in its PERFORMANCE on YOUR job

Customer "REP" Offices
in Principal Cities

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You Can Lick Competition!

Competition is going to get tougher.

In addition to fighting a running competitive battle with other U. S. companies, you are likely to find yourself outflanked by competition from Europe and the Far East.

Foreign manufacturers are not only serving their home markets but are taking an ever larger share of business from American firms abroad and in the U. S.

Statistics tell the story. Last January, the National Foreign Trade Council estimated that U. S. exports in 1959 would be $17.1 billion, exclusive of military aid. Now, it has revised the 1959 figure to $15.9 billion. By comparison, the total for 1958 was $16.2 billion.

And the organization has raised its estimate of U. S. imports this year from $13.8 billion to $15 billion. In 1958, the figure was $13.2 billion. If the prediction is right, imports will show the largest gain in any one year. They also will be the highest on record and almost balance exports.

As an American manufacturer, you have no pat answer for world-wide competition that also is striking so hard here at home. But, as suggestions, here are things some companies are doing:

A machine tool builder redesigned a machine and chopped the price in half.

A toolmaker, undersold by a Japanese competitor by 40 per cent, is working on design and manufacturing changes to wipe out the differential.

An equipment builder with a new plant in Germany will ship parts to the U. S. for assembly.

A ball bearing maker has a tie-in with a Japanese company and will market the product here as well as abroad.

A sewing machine company automated its plant to bring costs in line with those of foreign competitors.

An elevator builder processes export orders here and allocates them to its foreign plants.

Many companies have licensing and manufacturing arrangements abroad, or are buying or building plants.

Those are only a few approaches to the problem of protecting and expanding your business.

You can lick competition, but it means thinking internationally as well as domestically!

Irwin H. Such

EDITOR-IN-CHIEF

After 30 years' service these 8 Cleveland speed reducers needed no new parts!

Here are eight Cleveland Worm Gear Speed Reducers that have been on the job in this wire drawing plant continuously since 1929. Recently they were dismantled — then reassembled without *any* replacement of parts. Good for many more years of rugged service.

This is typical of the type service you can expect when Clevelands handle the right angle transmission of power in your plant. They save space and make for easy installation.

Before you buy machines or mechanize existing equipment, check and see what Clevelands can do to improve your operation. The complete story is contained in Bulletin #145. Write for your free copy, today.

The Cleveland Worm & Gear Company
3270 East 80th St., Cleveland 4, Ohio

A subsidiary of
Eaton Manufacturing Company

Affiliate: The Farval Corporation

CLEVELAND
Worm Gear
Drives

Losses Mount and Spread as Strike Heads into 3rd Week

Lost Steelworker Wages:

$135,200,000

through July 27

Lost Steel Sales:

$378,000,000

through July 27

Lost Steel Production:

3,680,300 ingot tons

through July 27

Other Losses:

$20,000,000—Cost of shutdown for strike.

$20,000,000—Cost of startup after strike.

$72,000,000—Cost of overhead, depreciation, and salaries of nonproduction workers in steel through July 27.

WHO'S GOING TO RUN THE BUSINESS — LABOR OR MANAGEMENT? That's the real issue behind the steel strike.

It was indicated early in the year when management took the offensive in the steel labor negotiations. In newspaper ads, in letters, via radio and television, key executives emphasized the need to combat inflation. They won the public to their side—and even picked up the support of many USW members despite Dave McDonald's promise of a billion dollar bundle.

When contract talks started, the issue became crystal clear. Management demanded the return of some of its prerogatives lost in the last couple decades of negotiating. Specifically, management wanted to: 1. Modify restrictive contract language to facilitate operating improvements. 2. Reinforce provisions against wildcats, slowdowns, and picketing. 3. Obtain full rights to develop incentives and set sound standards. 4. Clarify its right to change work schedules. 5. Tighten vacation provisions. 6. Simplify seniority provisions. 7. Eliminate duplicated benefits. 8. Generally clarify contract language to achieve more co-operation and efficiency, less waste.

It meant rewriting Section 2-B of the contract to cut out featherbedding that costs the industry as much as 8 cents per manhour. Dave

McDonald said "No." He demanded the continuation of such practices and a billion dollar bundle of benefits besides.

• **New Bargaining Theme** — The firm stand taken by both sides signals a new era in collective bargaining—an era in which the key issue won't be wages nor fringe benefits but the determination of who is going to control operating policies of the companies.

Dave McDonald knew he could get a modest wage hike and fringe concessions for his 500,000 members if he would agree to rewrite some contract clauses — especially 2-B—that would curtail waste and boost efficiency.

Management points out that such waste is causing the loss of markets to foreign steelmakers and competitive materials. Management adds that this will cost labor more jobs in the long run than would be lost by ending featherbedding.

But Mr. McDonald refuses to talk on that point. And management won't talk about wages until he does. Result: A standstill in negotiations. All signs point to a lengthy strike. It's already costing jobs and lost revenues in other industries. The bill will mount as the walkout drags on.

• **Ore Stocks O.K.**—Steel mills will have enough iron ore to carry them through the winter if the strike ends by Labor Day. If it lasts until Sept. 15, the railroads will probably have to assume a share of the ore coming into the U. S. from the Lake Superior regions. Even if the strike should drag on to the beginning of the fourth quarter, no blast furnaces would have to be darkened due to lack of ore. Rail shipments from the Lake Superior regions plus the flow of ore from Labrador and Venezuela would make up for what the ore boats couldn't get in before the lakes freeze.

Stocks now stand at about 46 million tons across the nation. About 4 million tons a month can be brought into the U. S. while the strike is in progress. After settlement, about 17 million tons a month can be received at the steel plants (about 13 million tons via the Great Lakes) until November when about 8 million tons will be shipped. Usually, about 1 million tons are shipped in December. The industry will consume about 13 million tons a month during the fourth quarter and first period of '60, if operating expectations are met.

• **Oil Country's Ready**—Most oilmen can ride out a 90 day strike. They stocked up heavily on tubing, casing, and line pipe in the first half. And oil country supply houses generally have 30 to 60 days' stocks available. Some imbalances may develop by late August, if the strike lasts that long, but industry sources say swapping among companies plus the continued output of several producers (Lone Star Steel Co.'s contract, for example, won't expire until Sept. 7) will keep most projects on schedule. In addition, several fabricators of oil country goods had large enough inventories to continue production for some time.

• **Foreign Opportunists** — There's been no rush to buy foreign steel so far, but marketers of the imported products are boosting prices in anticipation of rising demand as the strike drags on.

Two warehousemen in Detroit told STEEL they hiked the price of their imported steel to the level of domestic quotations as soon as the strike began. In New York, many sellers of imported steel are booked into the fourth quarter on most products. Promises of importers now call for November or December delivery at an average of $15 a ton above the domestic price. In San Francisco, inquiries for foreign steel are mounting and prices are climbing. Galvanized sheets now bring $10.70 per 100 lb vs. $9 a few months ago. Foreign steel is pouring into the Port of Houston. As the strike began, 21,600 tons were being unloaded from five ships while two more vessels with an additional 7500 tons were waiting for dock space. One Houston depot posted $5 to $7 a ton price increases, effective July 20. Other area sellers indicate they'll follow suit. Most of the imports arriving in Houston come from Belgium and Japan.

Some importers have raised prices four times since February. The biggest demand for the foreign steel came in the first quarter and was shipped in the second period. Orders tapered off in May and June, but some sellers look for orders to head up sharply if the strike lasts until mid-August. There's some speculation in the industry that a 40 to 60 day strike would cause a large enough influx of orders for the foreign steel to hold back domestic sales when the strike is settled.

• **Warehouses Not Rushed** — Despite elaborate preparations (one Chicago service center canceled all vacations for the duration of the strike), warehouses haven't felt any scramble for the metal yet. (One exception: The demand for galvanized sheets can't be met and shortages are imminent.) A few report other large orders; most say demand is quiet to moderate.

• **Effect on Nonferrous**—Producers of zinc, nickel, and tin (who sell a substantial portion of their output to the steel industry) face operating cutbacks if the strike is not ended soon (Page 168). Zinc people will probably accumulate ores and concentrates and curtail smelter output. Nickel people plan no curtailments at present; they expect current lost sales to be almost entirely made up when a settlement is reached. Tin prices may weaken temporarily but the tin people generally say they won't worry unless the strike extends into the fall canning season.

Aluminum people are following the steel developments closely. They'll probably have to follow the steel settlement in their new contracts. The old ones expire Friday (July 31) for Aluminum Co. of America, Reynolds Metals Co., and Kaiser Aluminum & Chemical Corp. Industry observers believe the 35,000 USW members in the aluminum industry will continue to work after the strike deadline with any settlement retroactive to Aug. 1. They say the aluminum settlement won't be made until peace comes to the steel industry.

• **Construction Stopped**—Failure of pickets to allow their lines to be crossed and refusal of some building tradesmen to cross them is causing the tieup of several steel construction projects. About $200 million worth of work is halted in the Chicago-Calumet-Gary area; U. S. Steel, Inland, Youngstown, and Acme are affected. This comes at a time when the steel industry is sprinting back into the market for capital equipment (Page 74).

Jim Carey: Symbol of Troubled Labor

What do the major metalworking unions think of management's new bargaining philosophy? This article gives you the views of the IUE's president. STEEL will interview leaders of other unions in subsequent issues

"I see the bridges between labor and management falling away," says IUE's Carey

WHAT do labor leaders in the metalworking industry think of steel management's method of bargaining to regain its traditional prerogatives?

DO the labor leaders have any countermoves in mind?

To get some of the answers, STEEL interviewed James B. Carey, president of the IUE (International Union of Electrical, Radio & Machine Workers).

His was the first major industry union to run into the bargaining technique used this year by the steel industry. Management agreed on a position before bargaining started and didn't budge from it. (That's often called Boulwarism, after L. R. Boulware, a General Electric Co. labor relations executive.)

Jim Carey's thinking is that such bargaining means that "the bridges between management and labor are falling away." He dismisses "management prerogatives" and "peoples' capitalism" as "slogans" of "investment managers." And in reference to one of the major issues, he contends: "Any fool knows that there is inflation in China, and not because the coolies got higher pay."

Such an attack could be interpreted as a declaration of war, but Mr. Carey, who is willing to fight, insists that he has a peaceful solution: Appoint impartial fact finding committees to spell out the areas of friction before negotiations begin.

• **His Case**—As proof that such an approach can work, he likes to recall a prenegotiation meeting in 1937 (as president of the United Electrical, Radio & Machine Workers) with Gerard Swope, then president of GE. The meeting, says David Loth (in *Swope of GE*), "paid off for the union and the company."

"I demonstrated a firm belief in open relations with the company," says Mr. Carey. He states that the 156 day Westinghouse strike in 1955 could have been avoided if such relations had been maintained, adding: "Swope and I had an agreement to meet before we started fighting, so we would at least know what we were fighting about. If that had been applied with Westinghouse, it would have prevented the strike."

• **Another Strike?**—Currently, Mr. Carey is at odds with GE because of an alleged lack of communications. He says: "I'm supposed to be a powerful labor leader, and I can't even get a meeting with the president or the chairman—just their subordinates, and they just talk slogans, about free enterprise and featherbedding."

GE's present contract goes back to 1955, when it signed a five year pact with the IUE, with a reopener clause on job security in 1958. Nothing came out of meetings last fall, and Mr. Carey warns: "I owe GE a strike."

He expresses willingness to discuss the "immediate and ultimate objectives of the IUE" with top GE officials at any time. But he claims the union has the right to strike any time on the basis of the reopener and implies that it is well prepared.

• **IUE Is Strong**—The union has come a long way since it was formed in 1949, after Philip Murray expelled the UE from membership in the CIO because of alleged Communist domination. Jim Carey, who took over the helm of the IUE at the age of 38, has also come a long way.

Local after local switched to the IUE after Jim Carey took over. Its membership today is put at 425,000 —including about 50,000 members who are laid off. The union has representation in every major West-

inghouse plant except one in South Philadelphia and up to 100,000 members in GE plants. The old UE has been reduced to about 10,000 members at Westinghouse and 15,000 GE workers at Erie, Pa., say union sources. The IUE operates in Canada, Puerto Rico, and claims membership in all the industrial states of the South. Whitecollar membership may be 40,000.

The union is also well off financially. When the Westinghouse walkout ended, Jim Carey said the IUE's treasury was down to $300,000. By July 31, 1958, its net worth was up to $2.2 million, with $1.5 million cash on hand. In the year ended last July, its annual income was $5.4 million.

• **IUE Has Problems**—Aside from troubles with the UE, Mr. Carey has problems with the IBEW (International Brotherhood of Electrical Workers) and the IAM (International Association of Machinists). A union insider claims they tend to settle for weaker contracts than the IUE would, thus weakening its bargaining position.

But rival unions aren't the biggest headache. "We must organize new plants in self-defense," says one source, because technology is taking production jobs away from IUE members. He figures that employment in the electrical machinery industry in 1953 was 75 per cent production workers. Today, the figure is put at 68 per cent, and if the trend continues, it's expected to hit 56 per cent by 1969.

Since the IUE won GE's plant at Schenectady, N. Y., employment has dropped from about 20,000 to 12,000, says the union. "Unemployment of any kind is our biggest worry," says a union executive.

• **Look Ahead**—What can you expect from labor if the use of Boulwarism spreads?

Perhaps this profile of Jim Carey offers a clue. An industry executive describes him this way:

"He's the toughest guy in the world to deal with. He controls his negotiation team 100 per cent. No one else counts. He never indicates any desire to arrive at a settlement. He is a principled man who is hard to pin down so that a mutual solution can be arrived at."

Labor Can . . .

1. Improve productivity.
2. Co-operate on technological changes.
3. Accept new methods, reassignment of duties, elimination of unjustified idle time.

Management Can . . .

1. Eliminate contract clauses that slow productivity gains.
2. Insist on right to make technological improvements.
3. Train displaced workers for new jobs.
4. Tell employees economic facts of life.
5. Diversify operations so that there are no production peaks or valleys.
6. Expand markets by aggressive selling.
7. Create jobs by developing new products.

"JOBS DEPEND on sales—neither a company nor a union can guarantee job security. It is found in no contract except a customer's contract for products."

That's what a large metalworking company told union officials recently when a contract was reopened on the job security issue. The labor leaders weren't impressed. Then, as now, they sought security through gimmicks: Seniority, shorter workweeks, and contract clauses that make it almost impossible for management to change established (and often inefficient) work practices.

As he fights for an "improved" contract, David J. McDonald, United Steelworkers president, pays lip service to a program that really would contribute to greater job security: Higher productivity and co-operation on technological changes. "The union does not oppose technological change or the automation of equipment," he declares. But it steadfastly resists industry's efforts to amend the USW contract section 2-B, a clause that perpetuates inefficient methods. Because of 2-B, steelmakers can't reduce crew sizes without getting hopelessly embroiled in grievance procedures. They can't change incentives because workers think they

have a vested interest in the way the job is being done.

• In the long run, improving productivity is the only way to assure job security. Automation creates more jobs than it eliminates.

From 1908 to 1920, employees of Westinghouse Electric Corp.'s Lamp Div. used hand tools in a departmentalized layout. Output per operator was 160 lamps a day. As indexing machines were developed and gradually became more automatic, the sequence of layouts was changed to a semiproduction line, then to a production line, and then to a semicontinuous production line. By 1955, daily output per employee had risen to 2700 lamps. The price of a 60 watt lamp in 1955 was about one-tenth the cost of a World War I lamp, and the product was 170 per cent more efficient. Employment in the Lamp Div. grew from 2762 in 1939 to about 7500 today.

Thompson Products Inc. (predecessor of Thompson Ramo Wooldridge Inc.) employed 200 workers in 1918. For the next 38 years, it bought all the labor saving machinery it could find to "replace" the 200. In 1956, employment was 21,000.

• When industries face extinction, increasing productivity may be the only way to save jobs.

John L. Lewis, redoubtable president of the United Mineworkers, realized long ago that automation could help him in his battle with fuel oil and natural gas. Continuous mining machines reduced employment from 442,000 in 1948 to 175,000 today, but they upped output per man from 6.26 to 12 tons daily. In 1948, miners got $15.50 a day; today they get $26. Because total employment costs per ton (including vacation pay and welfare fund contributions) haven't increased, coal producers haven't been required to raise their prices.

• Unions exaggerate automation's impact on employment and overstate its ability to cut production costs.

A big midwestern manufacturer installed equipment costing $200,000 at one of its plants and displaced 42 workers whose yearly wages and benefits averaged $6200 each. Union officials said the company was money ahead because it had spent $200,000 to reduce its payroll by $260,400. Actually, costs went up because the firm had to boost wages and fringe benefits of the remaining employees by more than $1 million.

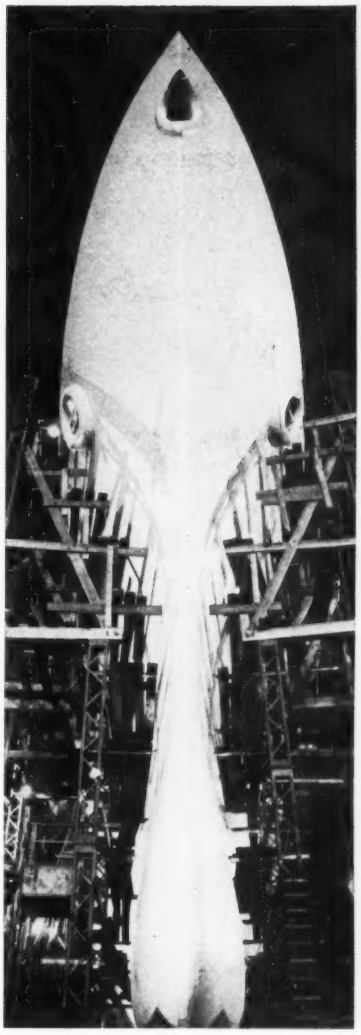
• Jobs can't be saved in a competitive economy by shortening the workweek.

Manufacturers are already paying for a lot of hours that aren't worked. In many companies, workers get an average of 12 days' vacation and seven paid holidays. That's 19 days, almost four workweeks. Employees are working a 37½ hour week. When a company reduces its workweek, it reduces its income base. What's more, it finds that a 10 per cent reduction in hours costs more than a 10 per cent increase in wages. Reason: More people must be put on the payroll to get equivalent production. Costs of major benefits (pensions, insurance, vacations, and holidays) vary with the number of workers, not with the hours worked.

• To guarantee an annual wage, you need guaranteed productivity and production.

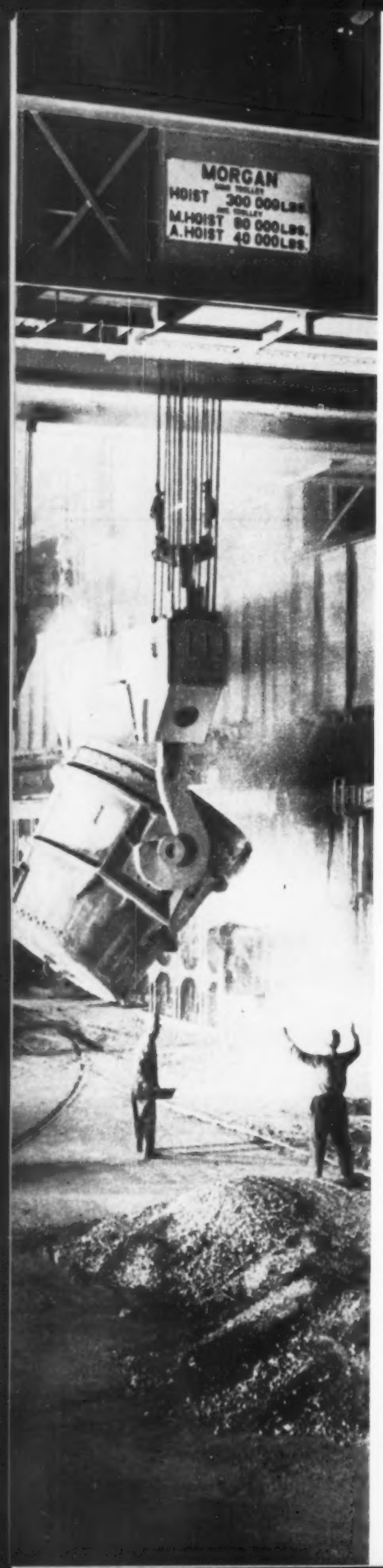
In 1956, Harold J. Ruttenberg, president of Stardrill - Keystone Co., Beaver Falls, Pa., offered to guarantee senior employees a full year's pay at their average straight time rates if he could: 1. Credit all fringe payments (holidays, vacations, overtime, shift premiums, and sick leave) against the 2080 hour guarantee. 2. Deduct 40 hours' pay for each day's absenteeism. 3. Assign workers to any jobs that were available when there was no work for them in their regular departments. Although employees favored the plan, top officials of the United Steelworkers (of which Mr. Ruttenberg was once the research director) said they didn't want to "experiment."

• This is the last in a series of three articles on job security. The first ran July 13 and the second appeared July 20. An extra copy of any or all in the series is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

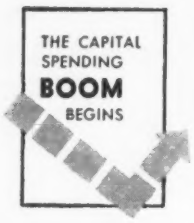


Our First Atomic Cruiser

NEARING completion at the Quincy, Mass., shipyards of Bethlehem Shipbuilding Div., Bethlehem Steel Co., is the cruiser *Long Beach*, first nuclear powered U. S. Navy surface vessel. The atomic cruiser will be powered by two nuclear reactors developed by Westinghouse Electric Corp. at the Atomic Energy Commission's Bettis plant in Pittsburgh. The ship is 721 ft long, has a beam of 73 ft, and a displacement of about 14,000 tons. Original designwork on the cruiser's reactors began in the fall of 1955 at the Bettis plant. Land based prototypes of the ship's reactors were constructed at the Naval Reactors Facility at Idaho Falls, Idaho.



Spending for Steelmaking Equipment to Shoot Up 43% in Second Half vs. First



That's what STEEL learned when the companies that make up 60 per cent of the nation's steelmaking capacity told us their confidential spending plans. Here's how orders will change for various types of equipment in the second half of '59 vs. the first half:

Blast furnaces & related equipment	10% less
Electric furnaces & related equipment	21% more
Coke ovens	44% more
Rolling mill facilities:	
Flat rolled product facilities	48% more
Bar mill facilities	32% more
Blooming mill facilities	22% more
Rod & wire mill facilities	28% more
Cleaning & finishing equipment	41% more
Other steelmaking equipment	37% more

STEELMAKERS are sprinting into the market for capital equipment —despite the strike. Companies representing 60 per cent of the nation's steel capacity told STEEL they would place orders for 43 per cent more equipment during the second half than they did during the first six months.

Most said that even a long strike would not cause them to materially alter their plans—except to revise delivery schedules.

• **Equipment Builders Confirm It**— A STEEL survey of equipment makers shows that inquiries are high, and quotations are picking up rapidly. Most aren't too worried about the effects a strike will have on incoming orders. Most steelmaking equipment is bought on long lead-time. The suppliers say that any order curtailment during the strike will be made up in an order rush after the settlement.

Some equipment makers believe a 60 day walkout would cut into their third quarter expectations. A manufacturer of cutting and welding equipment, for example, says a two month stoppage would mean that its second half orders would only equal those of the first half. But most of the builders look for orders to merely be delayed, not canceled.

• **Need Overcomes Strike** — On some equipment, the need may overcome the effects of the strike. Listen to this major producer of rolling mill equipment: "Some programs will be delayed until the strike is settled, but, coupled with low buying during the recession,

this will cause a substantial upturn in orders during '59's last quarter and the first half of '60. The mills need the new equipment. They've waited a long time for it, and they now have the profits to invest in it."

The president of a large steel company told STEEL he agrees that much new equipment is needed by most mills, including his own. "We must lower our manufacturing costs to offset our excessive wage burden and meet the import threat. But how do we finance the new equipment? Depreciation allowances are far from adequate. Our profit curve just recovered from the recession when the union came along with a new set of demands that would, if met, either lower our profits or raise our prices, or both. And the strike will send our third quarter profits into a tailspin. It means we probably won't be able to buy all the equipment we want. But we'll order more in the next six months than in any half for quite a while."

Here's the second half outlook by categories:

Rolling Mill Equipment

STEEL's survey of buyers shows substantial increases in orders are coming (see table). The survey of companies making rolling mill equipment confirms that report. Only one company looks for fewer orders in the second half than in the first. Other estimates range from "about the same" to "up 50 per cent."

In a memo to department heads, the president of one major supplier confides: "We're experiencing an increase in inquiries and orders which signals that the upturn in capital goods buying is underway. Delivery dates are again becoming an important consideration."

He lists four reasons for "expecting an early upturn in orders for rolling mill equipment": 1. Recurrent expansion of primary capacity. 2. Changing markets that result in a need for new finishing facilities. 3. The impact of obsolescence. 4. The trend toward more flexibility in finishing facilities, plus a desire to get wider product diversification.

• **How Years Compare**—The average producer of rolling mill equipment expects his second half, 1959, orders to top those of the like 1958 period by 44 per cent. Estimates vary from "up 20 per cent" to "up 100 per cent." For the year, 1959, the average maker looks for 39 per cent more orders than in '58.

• **Forecast for '60**—The suppliers don't expect the boom to end this year. The average manufacturer sees 28 per cent more orders in 1960 than he's getting this year.

• **Prices**—More than half the suppliers raised quotations the past year. The average hike: 5 per cent. But they haven't always made the new tags stick. Business is still highly competitive. Only 1 in 3 producers is planning to hike prices in the coming six months—and most of these say they'll do it only if steel prices increase.

• **Exports** — Suppliers expect 1959 export sales to about equal those of 1958. They say it's getting much tougher to sell abroad. They're undercut in price by foreign firms, but manage to hold a small share of the world market through superior design. A few foreign firms are attempting to invade the U. S. market but have had little success so far. They are shipping some components into the country.

• **Outlook for Rolls** — First half sales were nearly double those of 1958's first half. Second half sales could be 70 per cent better than in the second half of last year, if the strike is settled by Labor Day. Mill inventories are low. Prices were hiked about 5 per cent late in 1958 to offset higher labor costs. If the steel industry succeeds in holding the USW to a small wage hike, you can look for stability in roll prices. Otherwise, look for an increase commensurate with the added costs.

Electric Furnaces

Buyers indicate they'll spend 21 per cent more for electric furnaces in the second half than in the first. The average furnace manufacturer foresees a 17 per cent gain. Total '59 orders will exceed those of 1958 by about 30 per cent.

• **Prices**—Most makers have boosted published prices, but selling prices haven't always kept pace. Price fighting is terrific on the smaller jobs, say several suppliers. You can expect prices to firm by yearend, and a few makers hope to push through small increases.

Open Hearths

Look for a big increase in spending for open hearths and auxiliary equipment in the second half. Reason: Little was spent in the first six months. One supplier reports about $30 million will be spent by U. S. and Canadian steelmakers in the second half compared with less than $3 million in the first half. It means that '59 sales will be a little better than those of 1958. Prices are firm with no major hikes expected.

Coke Ovens

Less than 30 ovens were ordered in the second half of 1958; 263 were ordered in the first half of 1959; 350 to 400 will be ordered during the second half, unless the steel strike drags on into the fourth quarter. That's the indication from buyers and sellers alike. Look for prices to rise about 5 per cent after the steel strike is settled.

Annealing Furnaces

The average producer looks for 15 per cent more orders in the second half than in the first. It means 1959 orders will exceed those of 1958 by at least 20 per cent. Price shoppers can get a better deal today than they could a year ago. But prices should firm by yearend.

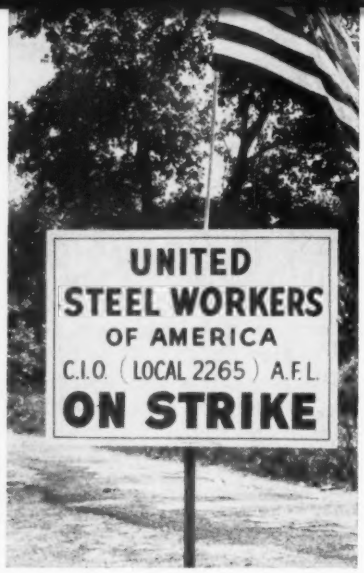
Blast Furnaces

The second half order rate for blast furnaces and related equipment probably won't quite match that of the first. With no new furnaces scheduled, work will consist of rebuilding and relining. Steelmakers contacted by STEEL indicate 10 per cent less of that kind of work in the second half than was done in the first. Two steelmakers are talking about new furnaces, but neither firm has yet committed itself to place an order.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Metalworking's

Major Problems:



	PRICE FIGHTING	WAGE PRESSURES
Severity ▶▶▶	Damaging in some lines (examples: Much capital equipment, components, some consumer durables). Serious in many other lines. Slackening in some fields where rising volume permits price firming.	Still at a peak (example: USW wants a billion dollar bundle). Pressures are changing a little in the direction of labor's desire for more fringe benefits, sometimes in lieu of wage hikes.
Outlook ▶▶▶	Will decline in some areas as manufacturers realize enough volume to stop emphasizing price in their selling. Will get worse in other fields. Price wars are easy to start, extremely difficult to stop.	Will become less severe in immediate future as management continues its new, tough, hold-the-line policies, like steelmakers are doing. But no significant lessening in labor's demands can be expected in the long run.

How Plant Managers Rank Them

(Percentages)

	1st	2nd	3rd	4th	5th	6th
Price competition	**62**	16	9	6	6	1
Pressure for wage increases	12	**37**	18	15	12	6
Inflation	10	20	**34**	19	12	5
Tax reform	5	10	18	**29**	24	14
Inadequate depreciation allowances	2	7	12	22	**36**	21
Foreign competition	9	10	9	9	10	**53**

TODAY'S metalworking manager is like the tournament golfer in a sand trap with trees blocking a clear shot to the green, bunkers on both sides, and a water hazard cutting across the fairway. He has problems. They're numerous. They're big. They're urgent. And they're preplexing.

Unlike the golfer, one good shot won't get the manager out of his predicament. But he'll stay under par if he can solve the six biggest problems (see table) for his company in the next few years, although he may have a tough time keeping out of some new hazards on the way.

• Examine Your Plight — STEEL.

HIGH TAXES

Taxes are taking a record share of metalworking's profits. State and local governments continually find new ways to dig into the business treasury. In some areas, managers call taxes "ruinous."

On the federal level, no corporate tax cuts are immediately in prospect, though talk is getting louder. On the state and local levels, you can expect some more boosts as governments battle fiscal instability.

POOR DEPRECIATION POLICIES

Outmoded federal policies cost metalworking millions of dollars annually. It means that companies either find other ways to finance new equipment or they get along with old, inefficient machines.

Congressional interest is finally being obtained. Two Senate subcommittees heard testimony last week. Some other representatives are warming to the need for a change. Next year, you may see some kind of action.

FOREIGN COMPETITION

In some products, it has already taken a heavy toll (examples: Typewriters, bicycles). In others, it threatens to do the same (examples: Turbines, some machine tools). It has reached the rugged point in other machinery, in steel, in autos, and other lines.

It'll get worse where it now exists. In steel, for example, the strike has given foreign producers a tremendous opportunity to enter markets they couldn't touch before. And it'll become a severe problem in fields where it is mild.

asked 6000 general managers of metalworking plants to rank, in order of severity, the toughest problems facing them in 1959's second half. More than 6 out of 10 called price competition the No. 1 issue (see table). Pressure for wage increases ranked next, about 4 in 10 managers calling it Problem No. 2. Inflation, foreign competition, inadequate depreciation allowances, and tax reform (federal, state, and local) fill out the "scorching six."

The wise manager will not only be aware of the problems, but he'll keep himself informed as to their causes and potential cures. And he'll search for ways to lessen their effects upon his company's profits.

• **Price Fighting**—Metalworking is enjoying one of its best sales years. Yet important segments of the industry are being plagued by excessive price competition, a holdover from the recession. It's found in machine tools, electrical equipment, fabricated structural steel, castings, other components, material handling equipment—almost the whole realm of metalworking.

The prime cause is inadequate cost knowledge. Managers point out this pattern to STEEL: An unscrupulous buyer tells a salesman that a competitor is quoting a lower price. Instead of trying to get the order on the basis of higher quality, better service, or good delivery, the salesman thinks he has to meet the lower price—and home office management often permits him to do it. When a leading maker of a product cuts prices, competitors tend to follow, and an industry-wide price war is underway. Knowledge of the product's true cost combined with effective selling on points other than price will often avoid such a development, or rout it before it gets out of hand, say management consultants.

During the disastrous price wars of 1954, the American Gear Manufacturers Association cited a survey of 100 lost customers, of which only nine were lost because of price. Far more important, 68 drifted away

because of "the supplier's indifference." Maybe your salesmen are overplaying the role of price and underplaying the role of service in getting and keeping customers.

• **Wage Pressures**—Union leaders' traditional disregard for economic realities that present hurdles to higher wages will keep wage pressures from subsiding. Example: David McDonald, USW chief, wants a billion dollar bundle and his 500,000 members are losing wages in their attempt to get it. Mr. McDonald contends a big wage increase would be noninflationary, when everybody else's yardstick shows it would.

But steel management's stronger approach to bargaining indicates that industry is taking steps to meet this problem head on. Whether it can be offset depends a lot on the outcome of steel wage talks. A modest settlement would only halt the pressure for a time. And a strike in steel midway in the coming boom period (when customers wouldn't be able to build adequate inventories to ride out the stoppage) would presumably cause another wave of inflation.

There's been substantial contributions to the wage-price spiral this year in areas outside steel. A 6 cent an hour wage boost plus liberal fringe increases is a common settlement.

Barring the unlikely prospect that union chiefs will change their attitudes toward wage hikes, management's only approach to the wage pressure problem is this: An attempt to control the size of the bite coupled with labor-saving machinery that will keep productivity and profits up.

• **Outmoded Depreciation Laws**—But where will you get the capital for new equipment under today's federal depreciation policies? It'll probably have to come from profits. And that leads to another problem.

Take the case of Thompson Ramo Wooldridge Inc., Cleveland, and its "million dollar" turret lathe to replace an obsolete piece of equipment.

The price tag on the new lathe, with attachments, was $67,000. The firm had only $12,000 in depreciation reserves charged off against the lathe being replaced. The difference —$54,000—had to come from profits. That meant generating $112,500 in profits (the goverment took 52 per cent) to make the $54,000 available—and that required $1.25 million in sales.

Chances for depreciation reform are getting better, but there's still no indication of early action. A letter to your congressman will help solve this problem—ranked No. 5 by the metalworking managers.

• **Foreign Competition** — While about half the managers rank it No. 6, foreign competition is fast becoming one of industry's most serious problems. Significantly, the other half of the managers were almost equally divided among the first five places. It's an indication that competition from abroad has reached damaging proportions on some fronts and is heading there on others.

For example, several conveyor manufacturers told STEEL that it's hardly noticeable now, but threatening to become a problem. One indicator: They're losing part of their export market.

That's usually the first sign. If your export sales are dwindling, or if there's a downward trend in exports in your industry, you'd better brace yourself for the onslaught.

Machine tool builders and steel producers, who claimed big export markets only a few years ago, now are battling to hold onto their domestic markets. Most machine tool people agree that the only way to keep foreign markets is to manufacture their products abroad, where they can take advantage of a much lower labor cost.

Makers of soldering, brazing, and other kinds of joining equipment also are beginning to feel the import impact: Competitive products from England, Germany, Sweden, and Japan are being sold in their backyards.

SBA Makes First 501 Loan

The Small Business Administration has approved a $313,750 loan to the Business Development Co. of Rhode Island. It is the first loan to a state development corporation under authority of Section 501 of the Small Business Investment Act of 1958. It will assist the state company in providing funds to five small Rhode Island firms for expansion, modernization, and working capital.

Ford to Vinyl-Coat Automotive Steels

FORD MOTOR CO. shortly will begin producing its own vinyl clad automotive steel, under a new license agreement with U. S. Rubber Co. Ford already is using plastic coated steel in the 1959 Thunderbird interior. It plans to extend applications of vinyl laminates to other model lines.

Ford becomes the first automotive company to be licensed to use the laminating technique. Called the Marvibond process, it was developed in 1953 by Naugatuck Chemical Div. of U. S. Rubber.

Since Ford is a basic producer of both steel and vinyl, the adoption of the process is a logical step in the development programs underway in these divisions, says Irving A. Duffy, Ford group vice president.

• **New Styles**—Says George W. Walker, Ford vice president and director of styling: "Vinyl clad steel opens broad and exciting new avenues for the automotive stylist. For one thing, it offers that combination of economy, structural strength, and beauty which is always being sought after in car design. Its most immediate application probably will continue to be in the field of automotive interiors, but I'm sure it can be expected to have marked effect on exterior styling as well."

Ford, 13th largest steel producer in the U. S., will produce steel for the laminate at its Rouge plant in Dearborn, Mich., where a $35 million modernization program is scheduled. Vinyl film for the laminate will be made in Ford's chemical products plant in Mt. Clemens, Mich. This plant was activated in 1958 to produce vinyl auto trim.

The laminating process is a method for continuously bonding metal with semirigid plastic sheets to give the metal an attractive and durable finish before it is formed. Then it can be shaped and fabricated without damaging the plastic facing.

British Steel Output Up

Demand has been on uptrend since February, following recession in 1958. Auto industry pushing for more sheets. Pig iron production slips as steelmen turn to scrap

BRITISH steel production in June rose to the highest level in 16 months, bringing the second quarter about even with the corresponding period of last year.

Weekly output last month averaged 388,500 tons, about 4000 tons higher than in May. Consumption apparently is running even higher than production, however. Latest statistics from the Iron & Steel Board indicate that users of steel are still cutting inventories. Orders from both domestic customers and exporters have been rising since February.

• **Autos Rolling**—One of the big reasons for improved conditions in steel is the increase in deliveries to the auto industry. Despite labor disputes throughout the year at British Motor Corp., car assembly shops have been pressuring sheetmakers for bigger deliveries. The truck market is especially active, mirroring the general recovery of British industry from last year's recession.

Demand in July and August will fall appreciably because of the vacation season, but the outlook for the rest of the year is good. The export market to both North America and Europe is expected to make up for some of the seasonal slump in domestic demand for autos.

• **Below Capacity**—STEEL's British correspondent reports that while demand has improved it is still below the record second quarter established in 1957. He points out that two years ago, inventory accumulation accounted for a significant portion of steel shipments in contrast with this year's liquidation. Not all segments of the steel industry have shared equally in this year's prosperity. Although plate mills are steadily employed, the market for heavy beams and sections is slow, with operations well below capacity. Because of significant plant and equipment expenditures in the last couple of years, structural capacity may not be fully utilized until next year or later.

Total steel output for the year is expected to be about 20 million tons, estimates the Iron & Steel Board. Capacity is about 24.5 million tons. Unlike the situation in the U. S., last year's recession did not slow down major expansion or modernization projects. The industry spent about $300 million, up 10 per cent from the previous year. In 1959, spending will at least match that of last year.

• **Less Hot Metal**—Despite the fact that ingot production advanced in June, pig iron production declined, averaging 235,300 tons a week. For the second quarter, output was below the corresponding period of 1958, partly because of the decreased use of pig iron in relation to scrap in the steel furnaces.

Trade Missions to Establish Contacts

METALWORKERS who want to establish or expand business connections overseas, but can't spare the time to go abroad, can investigate the possibilities through three U. S. trade missions.

Under the sponsorship of the Department of Commerce, the missions, composed of qualified U. S. businessmen, will visit industrial and commercial centers in Italy and Sicily (Sept. 1-Oct. 16), Yugoslavia (Sept. 5-Oct. 16), and Peru and Ecuador (Sept. 12 - Oct. 25). Through personal contact and information centers at international trade fairs, the missions will carry your story to foreign businessmen who will contact you.

If you are interested, submit in triplicate the following information for each country in which you desire contacts:

1. A description of the type of business or products to be sold or purchased.

2. Whether interested in direct export or in appointing agents.

3. Whether a joint venture with a qualified firm, such as providing machinery, knowhow, or capital would be considered.

4. Whether consideration would be given to licensing a qualified company to make the products abroad. If so, give some pertinent facts concerning the nature of the arrangement.

5. Whether long term credits could be extended on production equipment for firms of good credit rating but which are unable to obtain dollar exchange.

6. Whether interested in locating sources of supply for products, materials, or services either for direct importation or to act as agent for such purposes.

7. If the U. S. firm can arrange to use foreign currency in payment for U. S. exports.

Send the information to: Trade Missions Division, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C.

New Sinter Plant Starts

Inland Steel Co., East Chicago, Ind., is making trial runs at its new sintering plant. Its capacity: 4000 tons a day.

The facility will supply sinter to six of eight blast furnaces and is expected to increase the ironmaking capacity of the Indiana Harbor Works by 300,000 tons a year.

Ships Get Washdown Gear

Special washdown fittings to combat radioactive contamination will be required equipment on all new dry cargo ships built under federal subsidy, says the Federal Maritime Board.

The washdown equipment, including fog spray nozzles and bulkhead clips to hold fire hoses in position, must be located so that spray coverage is given to lifeboats, weather decks, and all outside bulkhead surfaces. The equipment must be approved by the Navy Department and provided for in the base specifications of commercial vessels submitted for approval by subsidy applicants.

Administration of Buy American Act

A NEW gambit has been made in the hydraulic turbine industry's fight to stop the U. S. government from buying foreign made equipment. A letter from Perry A. White, vice president, Baldwin-Lima-Hamilton Corp., to Joseph Campbell, U. S. comptroller general, sets the stage for a debate that may last months and could possibly influence Congress into taking a second look at the Buy American Act—originally passed in 1933 as an antidepression measure.

Mr. White picks the President's executive order of 1954 as the place to begin re-evaluating the effectiveness of the act. That order set the present differential (6 per cent) between the American and foreign firm's bids as the line governing the award of a government contract. If the American's bid is more than 6 per cent above the foreign firm's, it is deemed to be "unreasonable" (the term used in the original act) and the contract goes to the foreign bidder. (A second 6 per cent differential is applied if the U. S. company will do the work in a labor surplus area.)

Mr. White wrote the comptroller general on June 22 (after the Office of Civil & Defense Mobilization had turned down General Electric Co.'s petition to stop imports of hydraulic turbines on national security grounds): "We contend that the use of this differential or any fixed differential . . . in evaluating foreign bids is in conflict with the Buy American Act . . ."

Differentials Are Not Part of Act

Mr. White evaluates the act this way: 1. It was established to safeguard American jobs, wage earners, and business enterprise. It states that work done for the government will be performed by U. S. firms with domestic materials unless it is "inconsistent with the public interest" or the cost is found "to be unreasonable." 2. Any determination of an "unreasonable" cost must take into account what it costs to produce the item in the U. S. "under American laws, with American labor, and at American wages." 3. To use a differential is to assume the foreign firm's bid is reasonable, something that is "without foundation in fact."

Reviewing the history of the legislation, Mr. White concludes that Congress has never taken any action directed toward weakening the act or repealing it. In contrast, he thinks the White House has moved against the wishes of Congress by establishing the 6 per cent differential. Before the order of 1954, the differential had been 25 per cent. After the change, says Mr. White: "Federal business was made much more attractive to foreign producers." In effect, the executive branch has amended a law passed by Congress, and that is unconstitutional, concludes Mr. White. "It is improper, illegal, and unconstitutional for the executive branch to emasculate and butcher the law through administrative regulations, policies, and practices, and abusive expansion of the purposes of subordinate clauses in the statute," he charges.

The Industry's Case Is Serious

Overlooking legal technicalities, the language of the act seems to be clear on this point: It was not designed to help foreign firms compete with domestic ones. But the executive order aids the foreigners by setting the 6 per cent differential. Federal procurement of turbines over the last ten years has accounted for over 57 per cent of the domestic companies' business. Average sales of hydraulic turbines run about $27 million a year. So the $9.3 million bid by Baldwin-Lima-Hamilton on the Big Bend, S. Dak., job for the U. S. Army Corps of Engineers amounts to more than a third of the industry's average annual bookings. Mr. White's letter to the comptroller general is directed specifically to the award of the Big Bend job to English Electric Export Trading Co. for $6.4 million.

While denying the petition to halt imports, OCDM did recommend that the President "review from time to time" the extent to which the U. S. is dependent upon foreign hydraulic turbines. Admitted OCDM: "If there were a substantial pre-emption of U. S. requirements by foreign hydraulic turbines, this could raise a question of national security." With that loophole in the OCDM decision against the domestic manufacturers and Mr. White's charge of "illegality" against the executive order, it seems the case is not over yet.

The probability of Congressional interest, including formal hearings, grows daily. And it looks as if the turbine makers can make a good case before Congress.

But State Department Has Its Say

As the new act in the turbine story starts to unfold, Congress will be treated to this opinion from the State Department: 1. National policy would be damaged overseas by restricting imports of turbines. 2. Foreign countries would react to our restrictions with restrictions of their own on our exports.

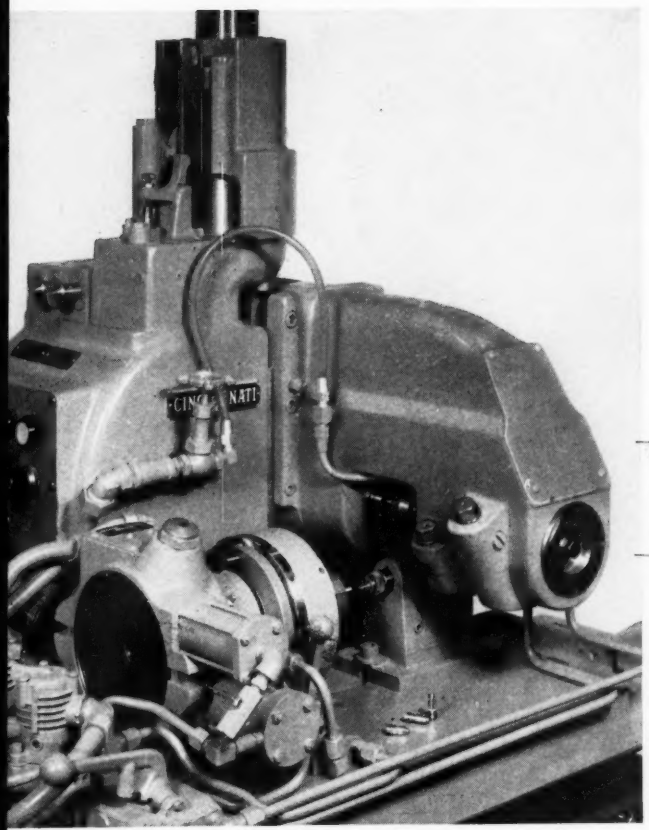
CINCINNATI 0-8

uses DUPLEX HEAD and AUTOMATIC INDEXING

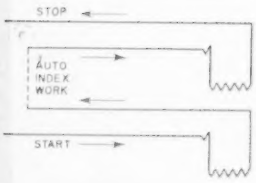
for High Production of SMALL PARTS

Milling 4 slots or flats 90° apart on small valve parts presented a real challenge in cost reduction. Cincinnati Engineering Specialists tooled up a CINCINNATI 0-8 Automatic Rise and Fall Milling Machine, with a duplex head to mill two surfaces simultaneously; and with an air-operated indexing fixture to perform two milling operations in one cycle without work handling. The result: **4 surfaces milled automatically in one continuous cycle, at a production rate of 139 to 150 per hour.**

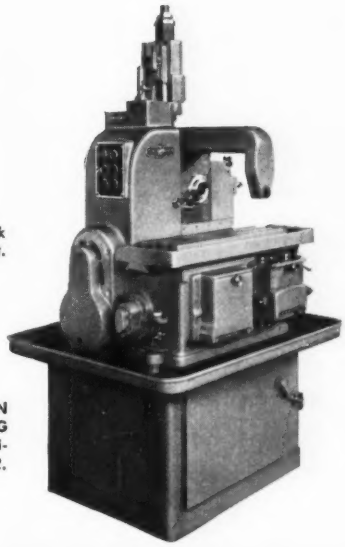
Are rising costs putting the squeeze on *your* profits? Cincinnati Engineering Specialists are experts in solving such problems with the aid of modern methods and new machines, such as CINCINNATI 000-4, 1-18 Automatics, the 0-8 described here, and the HyPowermatics. Send us your blueprints and data on problem components. Write today for complete details. **Milling Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**



TWO OPERATIONS are performed in one cycle on this CINCINNATI 0-8 Plain Rise and Fall Milling Machine, automatically milling 4 surfaces on small valves. Special tooling includes duplex head and air-operated indexing fixture.



Automatic cycle for work performed on machine at left.



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Administration of Buy American Act

A NEW gambit has been made in the hydraulic turbine industry's fight to stop the U. S. government from buying foreign made equipment. A letter from Perry A. White, vice president, Baldwin-Lima-Hamilton Corp., to Joseph Campbell, U. S. comptroller general, sets the stage for a debate that may last months and could possibly influence Congress into taking a second look at the Buy American Act—originally passed in 1933 as an antidepression measure.

Mr. White picks the President's executive order of 1954 as the place to begin re-evaluating the effectiveness of the act. That order set the present differential (6 per cent) between the American and foreign firm's bids as the line governing the award of a government contract. If the American's bid is more than 6 per cent above the foreign firm's, it is deemed to be "unreasonable" (the term used in the original act) and the contract goes to the foreign bidder. (A second 6 per cent differential is applied if the U. S. company will do the work in a labor surplus area.)

Mr. White wrote the comptroller general on June 22 (after the Office of Civil & Defense Mobilization had turned down General Electric Co.'s petition to stop imports of hydraulic turbines on national security grounds): "We contend that the use of this differential or any fixed differential . . . in evaluating foreign bids is in conflict with the Buy American Act . . ."

Differentials Are Not Part of Act

Mr. White evaluates the act this way: 1. It was established to safeguard American jobs, wage earners, and business enterprise. It states that work done for the government will be performed by U. S. firms with domestic materials unless it is "inconsistent with the public interest" or the cost is found "to be unreasonable." 2. Any determination of an "unreasonable" cost must take into account what it costs to produce the item in the U. S. "under American laws, with American labor, and at American wages." 3. To use a differential is to assume the foreign firm's bid is reasonable, something that is "without foundation in fact."

Reviewing the history of the legislation, Mr. White concludes that Congress has never taken any action directed toward weakening the act or repealing it. In contrast, he thinks the White House has moved against the wishes of Congress by establishing the 6 per cent differential. Before the order of 1954, the differential had been 25 per cent. After the change, says Mr. White: "Federal business was made much more attractive to foreign producers." In effect, the executive branch has amended a law passed by Congress, and that is unconstitutional, concludes Mr. White. "It is improper, illegal, and unconstitutional for the executive branch to emasculate and butcher the law through administrative regulations, policies, and practices, and abusive expansion of the purposes of subordinate clauses in the statute," he charges.

The Industry's Case Is Serious

Overlooking legal technicalities, the language of the act seems to be clear on this point: It was not designed to help foreign firms compete with domestic ones. But the executive order aids the foreigners by setting the 6 per cent differential. Federal procurement of turbines over the last ten years has accounted for over 57 per cent of the domestic companies' business. Average sales of hydraulic turbines run about $27 million a year. So the $9.3 million bid by Baldwin-Lima-Hamilton on the Big Bend, S. Dak., job for the U. S. Army Corps of Engineers amounts to more than a third of the industry's average annual bookings. Mr. White's letter to the comptroller general is directed specifically to the award of the Big Bend job to English Electric Export Trading Co. for $6.4 million.

While denying the petition to halt imports, OCDM did recommend that the President "review from time to time" the extent to which the U. S. is dependent upon foreign hydraulic turbines. Admitted OCDM: "If there were a substantial pre-emption of U. S. requirements by foreign hydraulic turbines, this could raise a question of national security." With that loophole in the OCDM decision against the domestic manufacturers and Mr. White's charge of "illegality" against the executive order, it seems the case is not over yet.

The probability of Congressional interest, including formal hearings, grows daily. And it looks as if the turbine makers can make a good case before Congress.

But State Department Has Its Say

As the new act in the turbine story starts to unfold, Congress will be treated to this opinion from the State Department: 1. National policy would be damaged overseas by restricting imports of turbines. 2. Foreign countries would react to our restrictions with restrictions of their own on our exports.

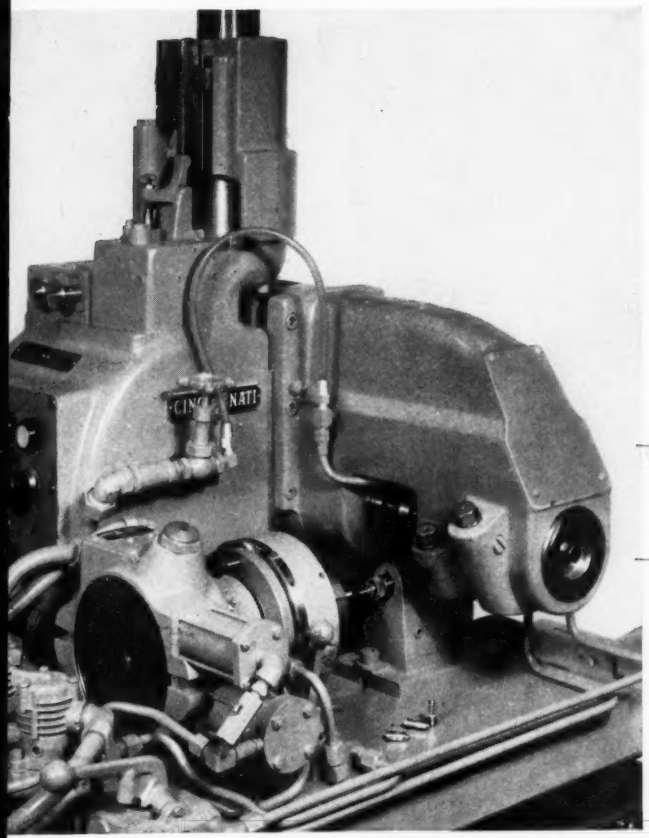
CINCINNATI O-8

uses DUPLEX HEAD and AUTOMATIC INDEXING

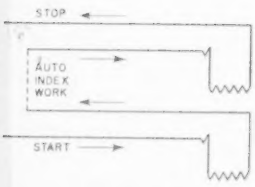
for High Production of SMALL PARTS

Milling 4 slots or flats 90° apart on small valve parts presented a real challenge in cost reduction. Cincinnati Engineering Specialists tooled up a CINCINNATI 0-8 Automatic Rise and Fall Milling Machine, with a duplex head to mill two surfaces simultaneously; and with an air-operated indexing fixture to perform two milling operations in one cycle without work handling. The result: **4 surfaces milled automatically in one continuous cycle, at a production rate of 139 to 150 per hour.**

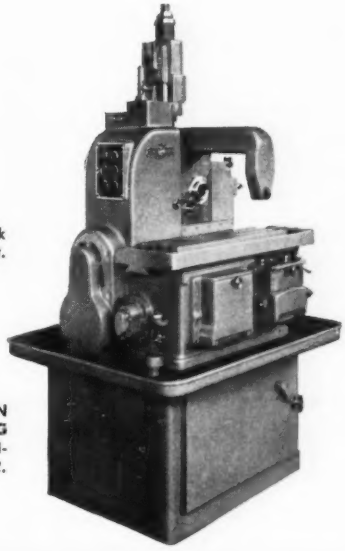
Are rising costs putting the squeeze on *your* profits? Cincinnati Engineering Specialists are experts in solving such problems with the aid of modern methods and new machines, such as CINCINNATI 000-4, 1-18 Automatics, the 0-8 described here, and the HyPowermatics. Send us your blueprints and data on problem components. Write today for complete details. **Milling Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**



TWO OPERATIONS are performed in one cycle on this CINCINNATI 0-8 Plain Rise and Fall Milling Machine, automatically milling 4 surfaces on small valves. Special tooling includes duplex head and air-operated indexing fixture.



Automatic cycle for work performed on machine at left.



CINCINNATI No. 0-8 PLAIN RISE AND FALL MILLING MACHINE. Complete specifications in catalog M-1607-2.

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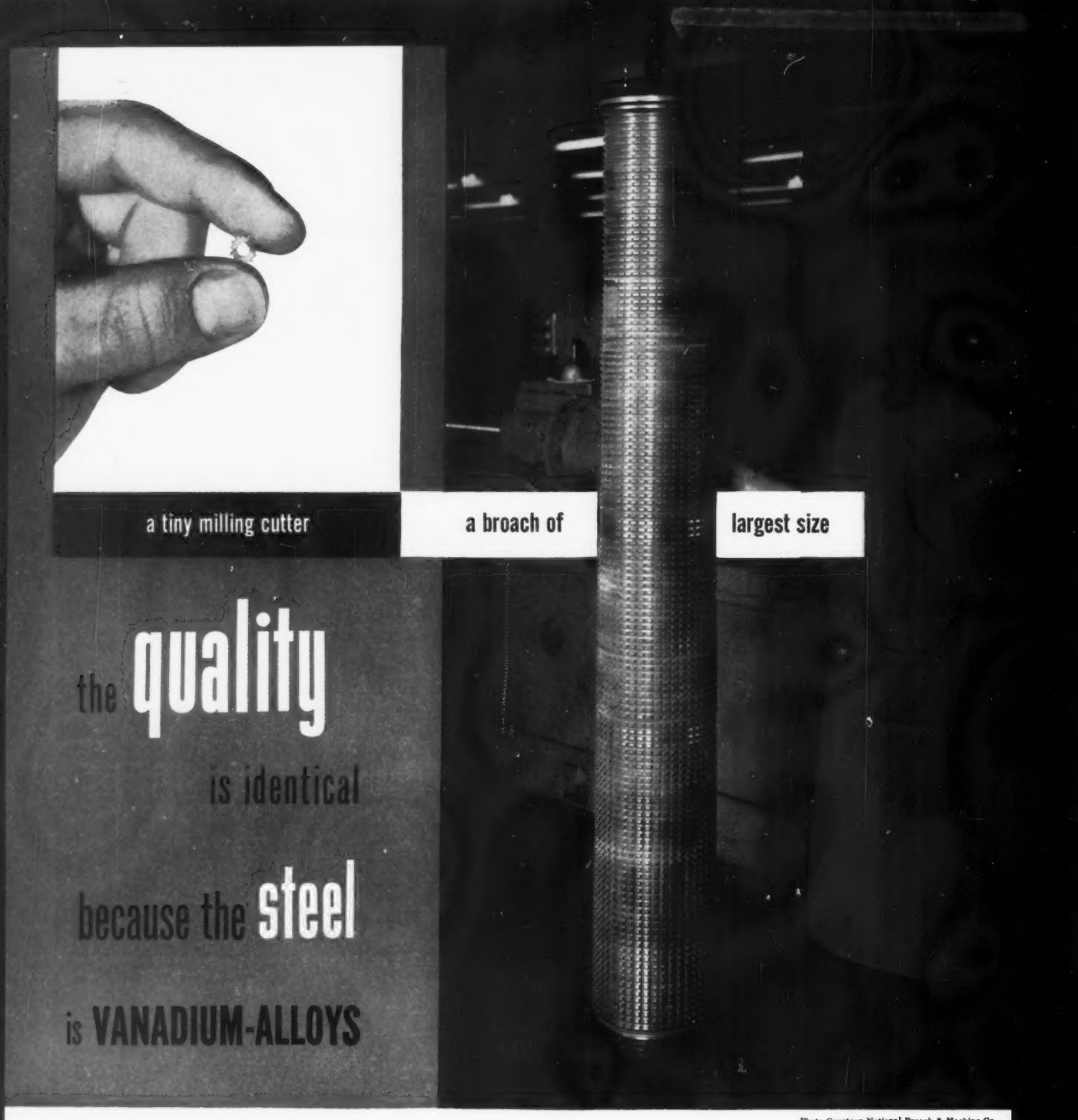

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- Red Cut Superior
- Neatro
- Van Cut
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FIRST QUALITY has a diamond-clear meaning when applied to our steels. It is a term expressing guaranteed excellence in a ⅛" bar from which thousands of miniature milling cutters are made—and equally in a bar from which may be machined the largest broach you care to produce. Sound steels for profit-making tools, in a complete range of grades, shapes and sizes. Let a Vanadium-Alloys' sales engineer consult with you on your needs.

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Clerical Pay Up, U.S. Unionizing Ebbs

Rise of $2 to $69 last year in weekly stipend here and in Canada shown in National Office Management Association survey. Organized labor shows gain in dominion

AVERAGE CLERICAL office salary rates in the U. S. and Canada have increased 92 per cent in the last 12 years, says the National Office Management Association.

Its annual survey of 6762 companies in 114 U. S. cities and 828 firms in 14 Canadian communities shows: The January, 1947, average weekly salary was $36. In March, 1959, the figure was up to $69. The increase averaged $2 in the last year.

Of the cities surveyed, Calgary, Alta., showed the biggest jump in the last dozen years with a 124 per cent rise. Milwaukee led U. S. cities with a 106 per cent boost.

• **Unions** — Paradoxically, a decrease in the number of wholly or partially unionized offices came with the wage increase in this country. Reporting firms revealed 7.8 per cent are now unionized vs. 8.2 per cent last year. The western U. S. was high with 11.3 per cent of the respondents having unions. Unionization in Canada is up to 9.4 per cent from 8.1 per cent in the last survey.

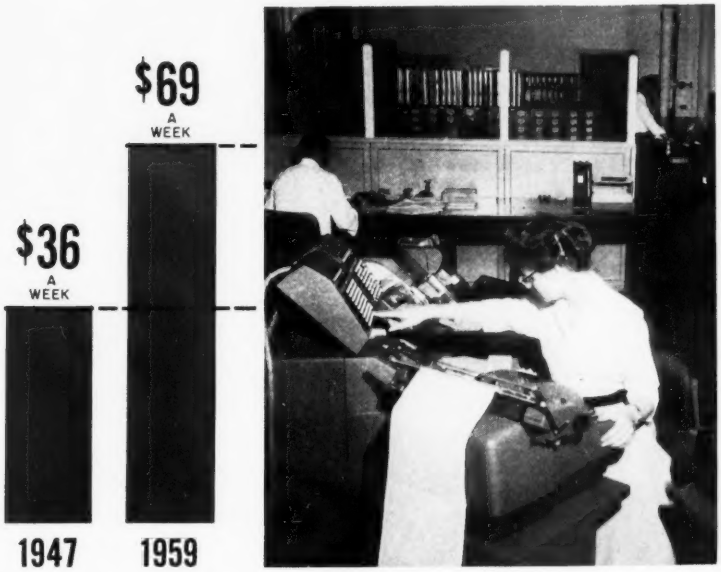
• **Workweek**—The 40 hour workweek is still standard for the majority of companies responding in the U. S.; 12 per cent indicate a 37½ hour week; 5 per cent work 35 hours; 4 per cent put in more than 40 hours. Canadians advocate shorter working hours with 79 per cent reporting less than 40 hours.

• **Overtime** — Overtime pay for weekly hours worked proved more important than daily overtime, since only 8 per cent did not pay weekly overtime. Of the reporting companies, 72 per cent pay weekly overtime after 40 hours. Only 13 per cent pay after basic weekly hours. Overtime "after 8 hours in one day" is paid by 42 per cent; 11 per cent pay "after regular number of working hours"; 39 per cent did not pay any overtime based on hours worked in one day.

• **Holidays**—Provision for six paid holidays per year is still most popular. However, there was a 1 per cent drop from last year. More liberal policies are on the upturn. The eastern part of the U. S. is most liberal with 57 per cent of the surveyed firms granting eight or more paid holidays. In Canada, 93 per cent grant more than seven.

• **Ratio**—The ratio of total workers (office and nonoffice) to office workers is 3.06 to 1. In 1948, it was 5 to 1. This year's figure is based on 1,473,345 office employees.

Clerical Salaries Soar 92% Since 1947



Economic Ignorance Cited

A plea for a program to correct "economic illiteracy" in this country was made by Forrest H. Kirkpatrick, Wheeling Steel Corp., Wheeling, W. Va., at the Summer Institute of American Studies, West Virginia Wesleyan College, Buckhannon, W. Va.

"There is gross misunderstanding and ignorance about profits, capital, profitability, productivity, depreciation, and return on investment, and yet these are part and parcel of the American way of life," Mr. Kirkpatrick said. "Decisions related to them which influence the strength and stability of our economy are made by individuals and organizations which seem to have little or no understanding of the vocabulary, let alone the principles of economics.

"Training and instruction in fundamental economics at various levels in the educational system would make for better citizenship and would provide a strong and positive bulwark against the errors of uninformed leaders," concluded Mr. Kirkpatrick.

Francis E. Blod specifies

Sharonart*

for the kitchen of tomorrow . . .

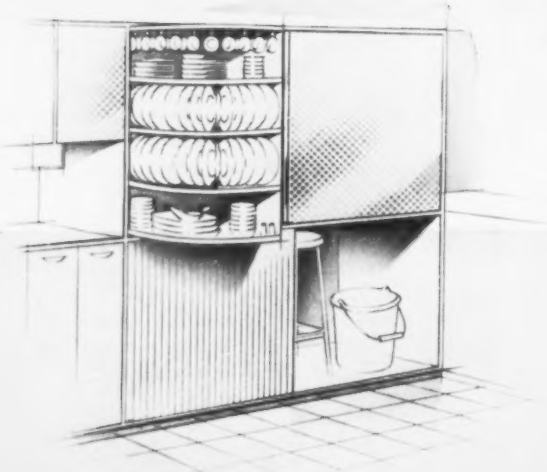
To give kitchen storage added utility and exciting style that blends with modern day kitchen appliances, nationally known industrial designer Francis Blod has taken advantage of Sharonart, to achieve the clean line, functional and highly attractive kitchen storage unit shown on these pages.*

A recipient of many national design awards, Mr. Blod is a Board Member and President Emeritus of the Package Designers Council, graduate and member of the Board of Trustees of the School of Design of Pratt Institute.

Sharonart*, Sharon's exciting new surface patterned steel, is stimulating the imaginations of leading designers everywhere.

It has all the strength, economy and forming advantages of steel, plus the mar resistance and added beauty of a textured surface. Ideal for wear areas, it permits model changing without retooling. Available in dozens of patterns, Sharonart* can be made in almost any special pattern to suit design requirements. Patterns are rolled in plain carbon steel or in stainless steel. Literature and samples available upon request from the Sharon representative in your area by writing direct to the *Sharon Steel Corporation, Sharon, Pa.*

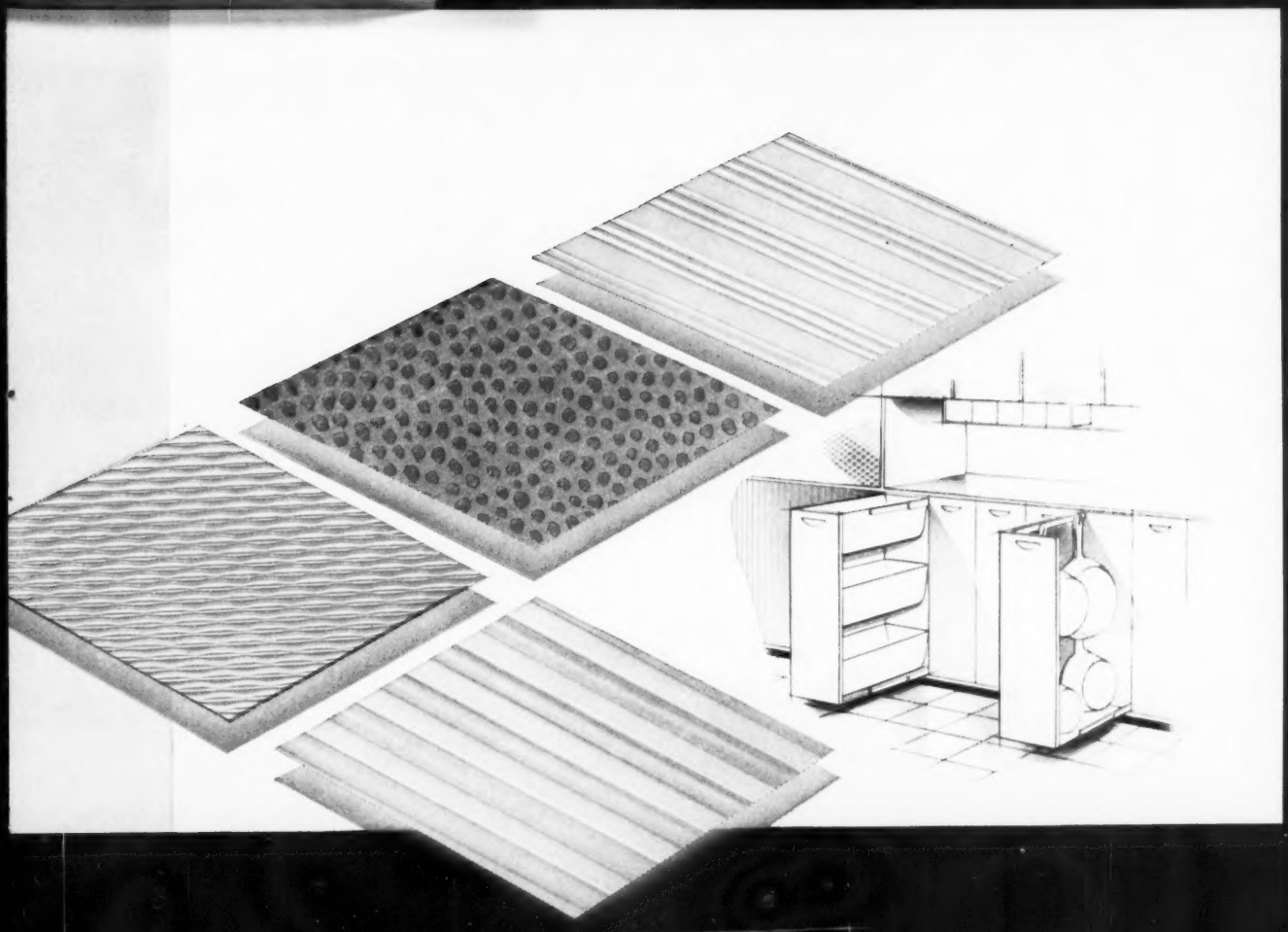
*TM

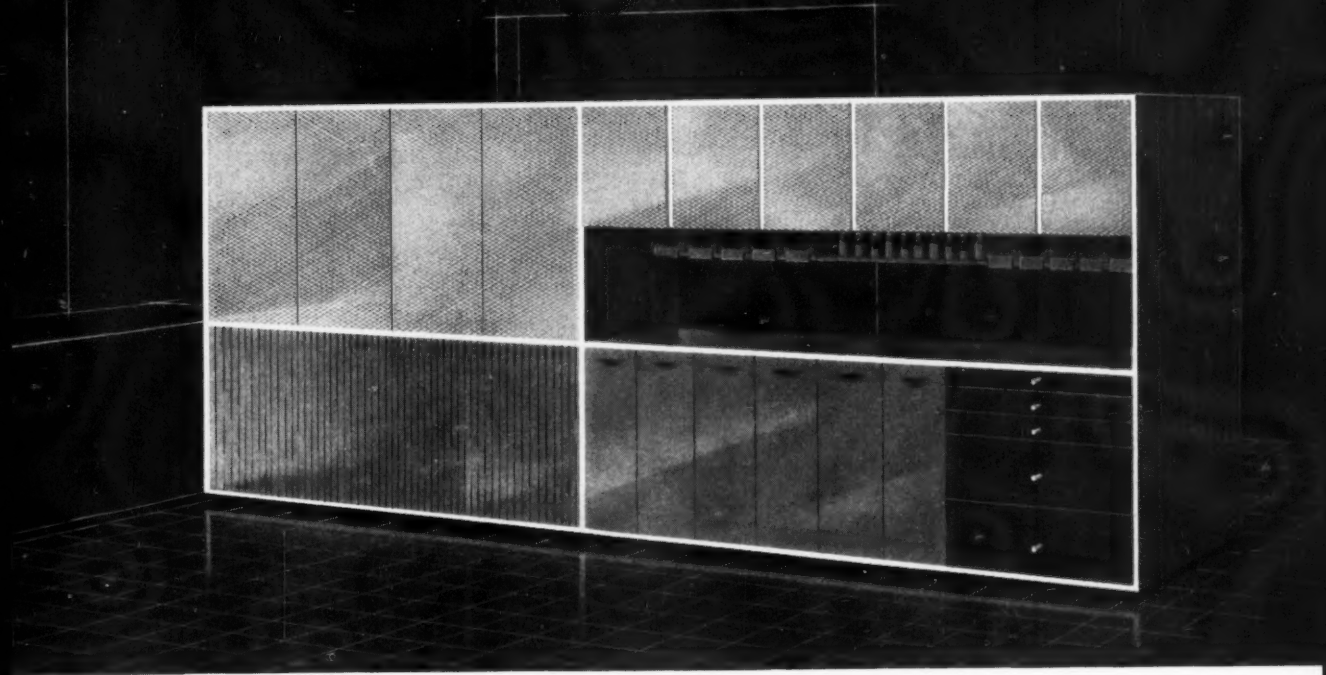


Rotating cupboard accomodates both dishes and glassware providing organization and ready access while preventing chipping. Sliding Sharonart panel utility section provides storage for outsized objects.*

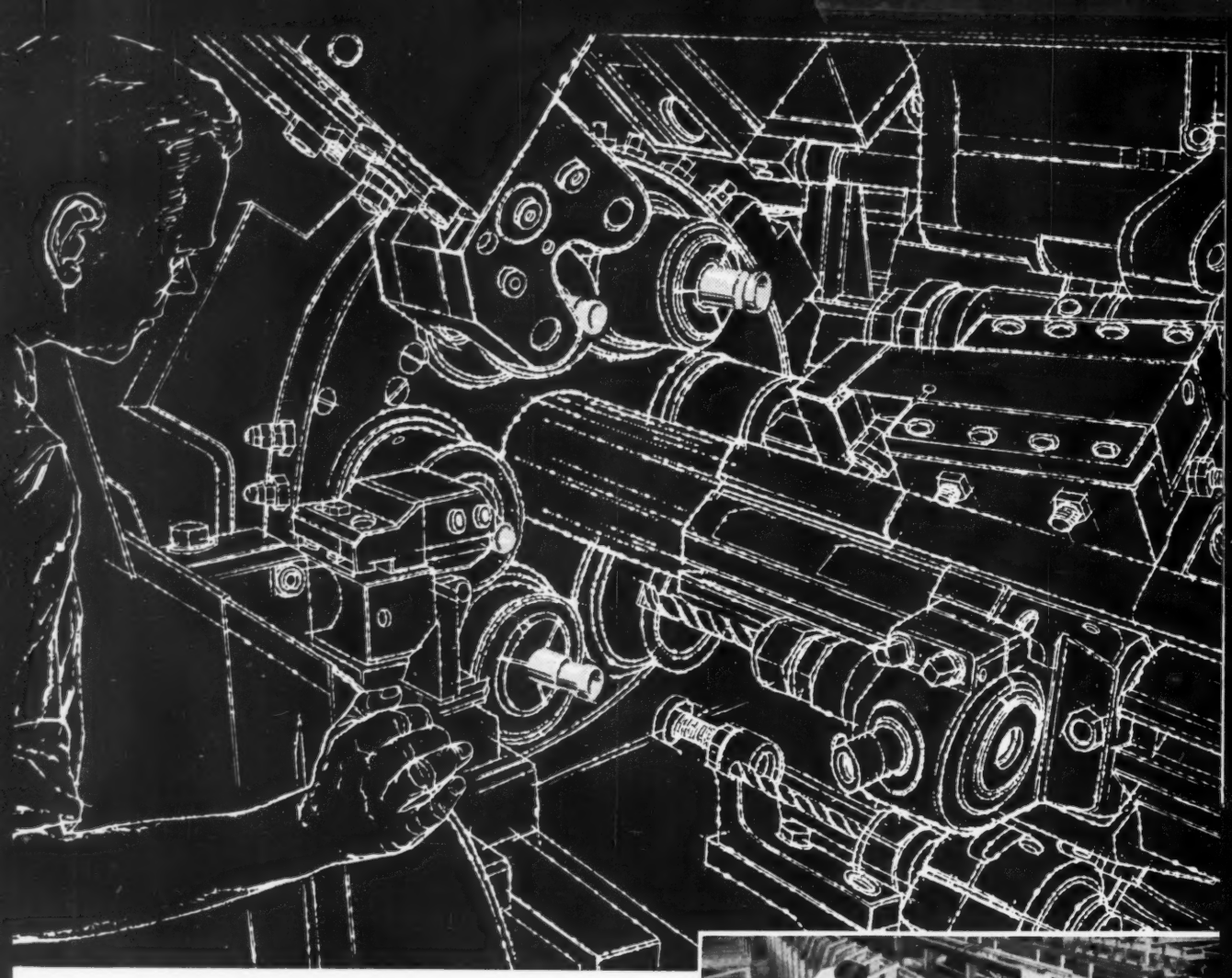
Pull-out bins offer ready accessibility to staple vegetables as well as pots and pans. Protruding handles are eliminated through the use of pressure sensitive spring loaded closures and recessed pulls.

Trim look of Blod designed kitchen unit includes flatware and linen drawers and automatic Sharonart stainless steel canisters adjusted to dispense premeasured amounts of dry foods, spices, etc.*





SHARON *Quality* **STEEL** SHARONSTEEL



The Ultimate Test

The ultimate test of quality in stainless steel bars takes place in screw machine production, where every bar is literally cut to pieces.

The Perry-Fay Company, Elyria, Ohio, a leader in screw machine production, has been subjecting J&L bars to this demanding production-line test for more than a year, **without a single failure, without a single reject.** Perry-Fay reports: "We consistently get superior surface finish, closer tolerances, fully formed rolled threads with J&L stainless bars."

Whether you need stainless steel bar stock for high-speed, high-production operations, or a single bar for extraordinary requirements, turn to J&L. J&L leads the industry in melt shop standards for stainless steel, the point where quality starts—and new production profits begin.

Careful attention to every production detail is the key to J&L quality.

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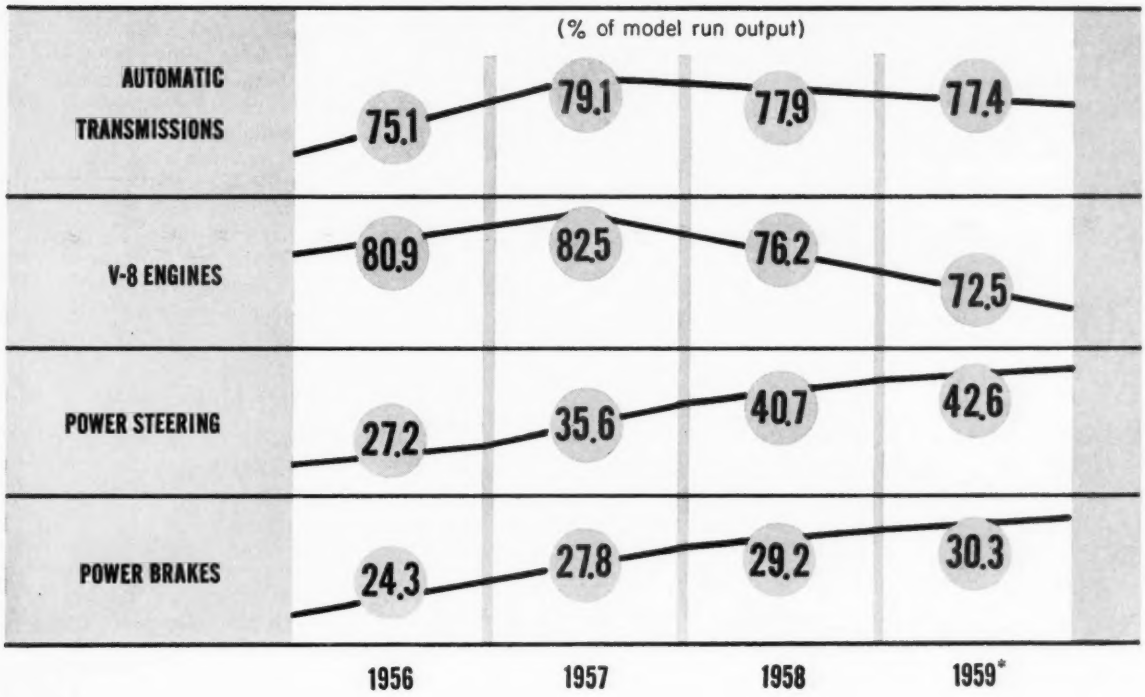
How the 'Options' Are Doing



*Preliminary.
Adapted from *Ward's Automotive Reports.*

BURGEONING sales of lighter cars are putting the brakes on what has been a steadily rising market for the important optional equipment listed above. The 1959 model run is about over, and it's increasingly evident that the once popular items will be slow gainers as long as car buyers want smaller, more economical automobiles.

This is particularly true of V-8 engines, power steering, and power brakes. Automatic transmissions probably will show a faster sales rate because even economy car owners seem to prefer easy shifting to saving a few pennies by using a straight stick.

It's estimated that 5.7 million 1959 cars will be produced by the time the last assembly lines are phased out in August. Chrysler Corp. and Studebaker are down now. Rambler, GM, and Ford divisions are expected to build out in the next three weeks.

With the unabated demand for more economical transportation, Studebaker-Packard and American Motors Corp., which accounted for less than 3 per cent of 1957 model output, are taking almost 10 per cent of the industry's 1959 production. But less than a quarter of the cars they're building have V-8 engines, power steering, and power brakes. Automatic transmissions are going into less than half of AMC's and S-P's output.

• **Quick Shift**—Pushbuttons apparently are the most popular shifting device. Chrysler Corp. is putting its pushbutton automatics into 84 per cent of the cars it's building this year. GM is close behind with 82.6 per cent. Only 76 per cent of Ford-built autos use automatics. S-P reports 34 per cent, AMC 49 per cent.

Although the percentage of automatics installed this year is about even with the 1958 figure, it still isn't up to 1957's record level. Detroit doesn't think sales will drop next year. The Big Three will offer simplified automatic shifts on the light cars. Outlook is that at least 77 per cent of the 1960 models will have automatic transmissions.

• **V-8s Falter**—Six cylinder engines made a rapid comeback when buyers started their economy kick last year. Next year, economists predict a million light cars will be sold. Most of them will have six cylinder powerplants. The forecast is that 30 per cent or more of the 1960 autos will be running on sixes instead of eights. American Motors is the biggest booster for the sixes. Only 11 per cent of its model run

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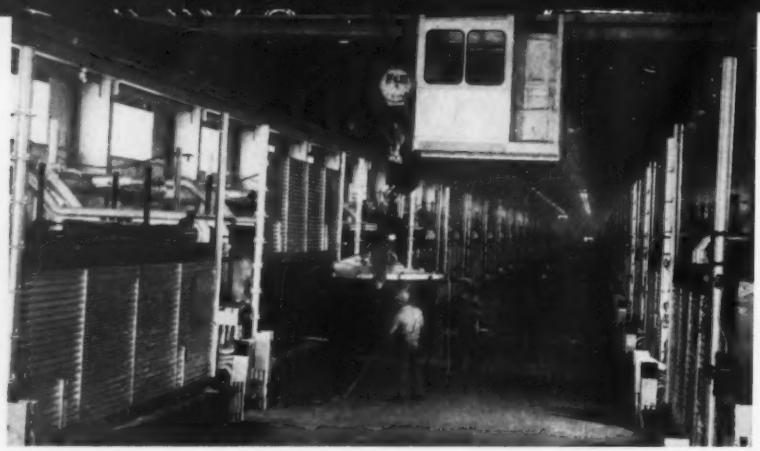

Reynolds Metals Co., Massena, N. Y., ships aluminum in . . .

these hot metal buggies to nearby Chevy engine foundry

will have V-8s. Some 28 per cent of Studebaker's Larks have the bigger engines.

Dual exhausts have suffered as a result of the V-8s demise. Less than a million sets of twin pipes (17 per cent) will be installed in 1959 models, says *Ward's Automotive Reports*. In 1957, 34 per cent of the cars were built with duals. Even in economy minded 1958 they were added to 24 per cent of the model run production.

Six Cylinder Installations
% of Model Run

	1959	1958	1957
GM	24	22	19
Ford Motor Co.	19	20	15
Chrysler	18	16	15
AMC	89	84	69
S-P	72	54	30

• **Power Sags** — Two latecomers, power brakes and power steering, have had less of a chance to make sizable market gains. Nonetheless, both options have shown steady increases since they were introduced in 1952. Power steering has been especially popular, and the industry generally believes no car over 3000 lb should be without it.

Now it looks like these accessories will be in for slower sales as lighter cars gain in market penetration. Although both items posted small gains this year, the rate is slower. Next year should see the same or possibly a lower installation rate. Forecasters are starting to talk about 6.7 million car sales next year. Even though a smaller percentage of cars may have these two options, unit volume undoubtedly will climb.

GM Divisions Expand

Chevrolet and Fisher Body Div. will double the size of their adjacent Baltimore assembly plants which comprise 1.04 million sq ft. Chevrolet will add 850,000 and Fisher Body 170,000 sq ft.

Announcing the project, Edward N. Cole, Chevrolet's general manager, says work will begin this fall.

Industry talk has it that Chevrolet's light car, Corvair, may be assembled in the Baltimore plant, but Mr. Cole points out that the modernization and expansion program is needed because car and truck building has become more complex, and the older plant needs to be made more efficient. The Baltimore facilities were opened in 1935 when Chevrolet built 12 car models in two series and 17 truck models. Today, Chevrolet has five series and 15 car models, as well as 139 truck models.

Exhaust Note

• A Detroit rumor: One of GM's 1960 models will have a flexible driveshaft instead of the present three piece linkage between the transmission and the differential. Such a coupling would eliminate universal joints, say the dopesters. Although this supposedly is slated for one of the larger cars, it may be that the rumor circuit is thinking of a short coupling between the transmission and differential on Chevrolet's Corvair.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	558,026	337,446
6 Mo. Totals	3,283,994	2,242,348
July	.....	321,017
August	.....	180,447
September	.....	130,460
October	.....	261,701
November	.....	514,152
December	.....	593,920
Total	.....	4,244,045

Week Ended	1959	1958
June 20	129,270	84,396
June 27	127,217	92,277
July 4	108,397	35,273
July 11	123,147	73,062
July 18	126,848†	85,533
July 25	120,000*	85,519

Source: *Ward's Automotive Reports*.
†Preliminary. *Estimated by STEEL.

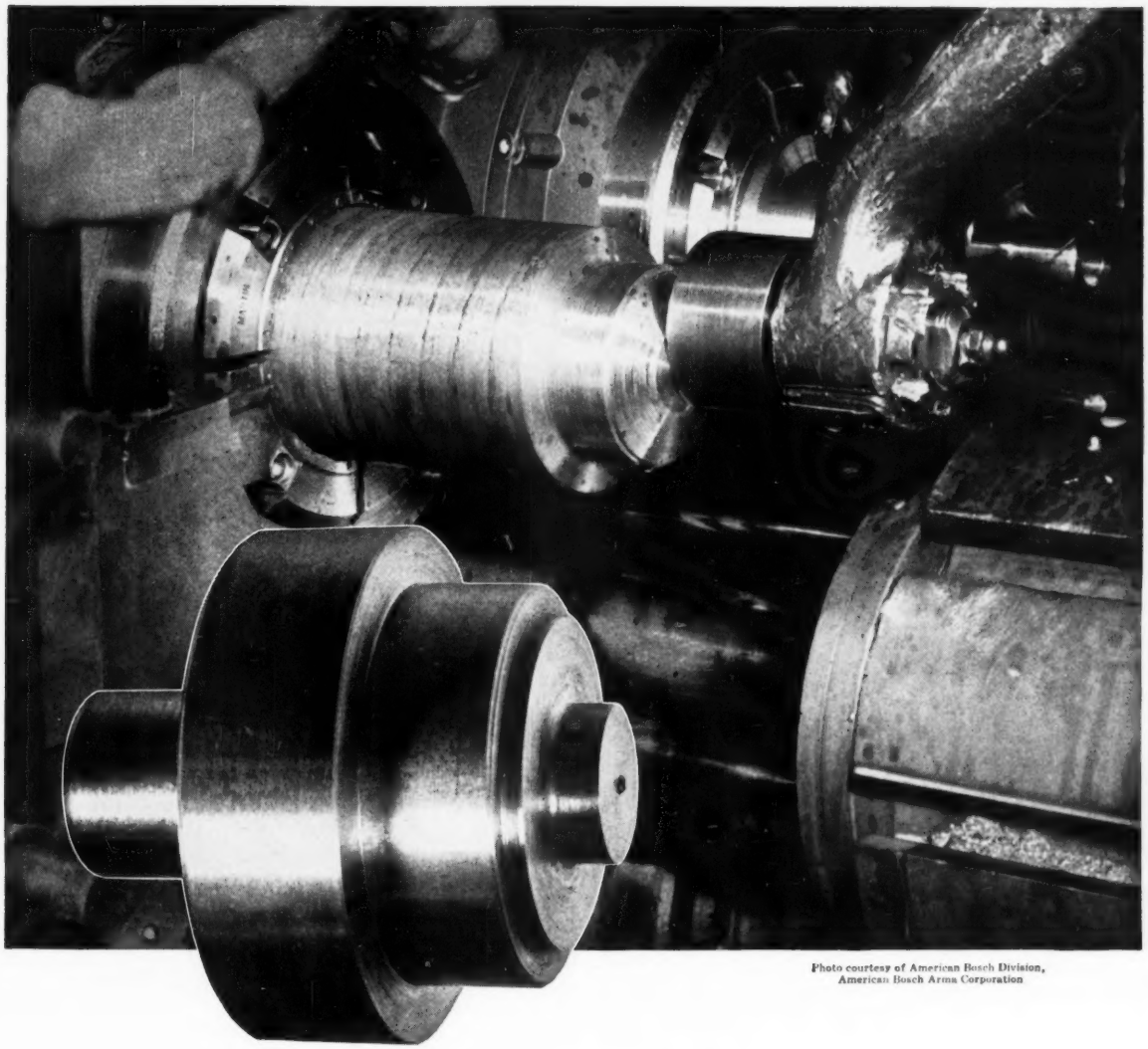

Photo courtesy of American Bosch Division, American Bosch Arma Corporation

Leaded Nitralloy Takes a Big Bite Out of Machining Time!

By switching to Nitralloy Leaded for this hydraulic head, secondary lathe operations and expensive heat treatment were completely eliminated. Produced in a single machining operation, the part is now sent directly to the grinding department. Spindle speeds and feeds were also increased.

For complete information about other fast-machining Aristoloy leaded steels or standard carbon, alloy and stainless grades, call the Copperweld representative in your nearest large city. Or write for booklet entitled, "A Complete Line of Leaded Steels," and NEW PRODUCTS & FACILITIES CATALOG.

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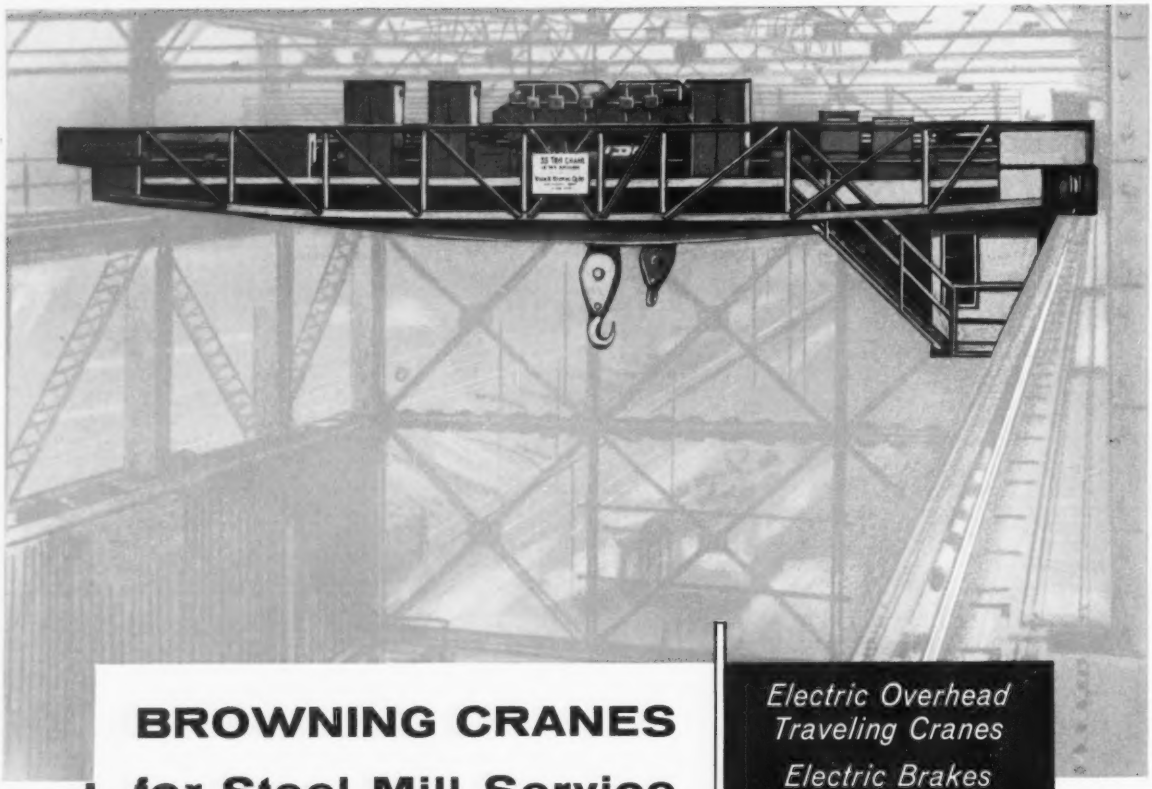

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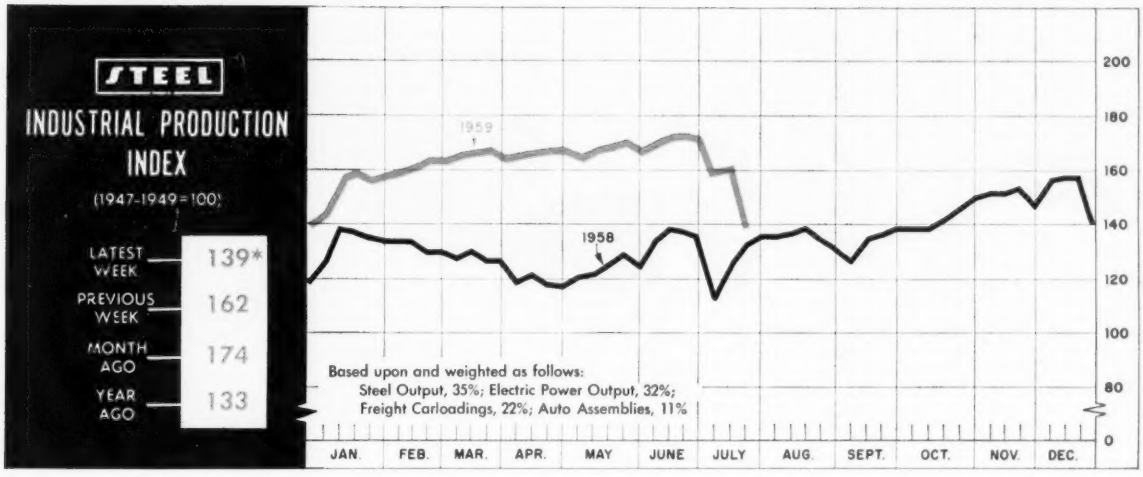


*Week ended July 18.

Index Plunges as Strike Takes Hold

WHAT GOES DOWN must come up.

Applied to America's economy, that seeming paradox is axiomatic. It certainly holds true for today's business trend which is excessively depressed by the steel strike.

• **Starts the Plunge**—The first major impact of the steel strike on the industrial production index above is a drop of 23 points in the week ended July 18. Having registered a preliminary 139 per cent of the 1947-49 base period, the trend line is destined to cut much deeper as effects of the strike spread.

As far as the components of the index are concerned, serious effects of the walkout show up only in steel production and freight carloadings. Steel producers still operating in the week ended July 26 turned out only 382,000 net tons of steel for ingots and castings, the equivalent of 13.5 of the industry's productive capacity.

The week before, when the industry was forced to shut down, production was 1,097,00 tons.

The railroads were among the first of the related industries to feel the pinch. If it hadn't been for the strike, the return of coal miners after their annual vacation would have pushed loadings to the pre-strike level of more than 700,000 cars. As it is, they are 100,000 to 125,000 cars below that mark.

Not all Great Lakes ore boats are tied up by the strike. But with ore miners out, they will be laid up once they run out of available ore. With coke requirements cut drastically, coal shipments will be down. As the strike paralysis spreads, it will hamper movement of miscellaneous and less-than-carload shipments.

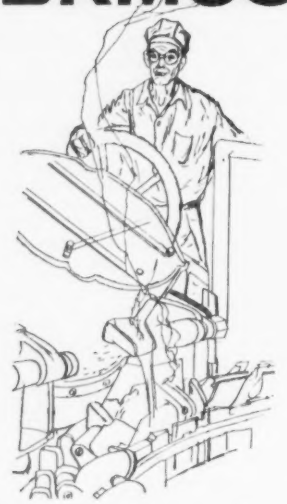
• **Sustaining Power**—So far, the electric utilities are holding their own. If this turns out to be a sizzling summer, output of electricity may not dip. But it's a cinch it won't expand much without the support of the steel industry. If the

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	382[1]	1,097	1,546
Electric Power Distributed (million kw-hr)	13,500[1]	13,502	12,257
Bituminous Coal Output (1,000 tons)	1,450[1]	1,680	1,393
Crude Oil Production (daily avg—1,000 bbl)	6,800[1]	6,802	6,528
Construction Volume (*ENR*—millions)	$446.6	$578.4	$733.0
Auto, Truck Output, U. S., Canada (*Ward's*)	164,107[1]	158,623	109,811
TRADE			
Freight Carloadings (1,000 Cars)	600[1]	554	582
Business Failures (Dun & Bradstreet)	237	244	275
Currency in Circulation (millions)[3]	$32,201	$32,112	$31,375
Dept. Store Sales (changes from year ago)[3]	+9%	+7%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,964	$22,767	$23,657
Federal Gross Debt (billions)	$287.1	$284.5	$275.6
Bond Volume, NYSE (millions)	$25.1	$29.1	$27.5
Stocks Sales, NYSE (thousands of shares)	15,558	18,720	15,415
Loans and Investments (billions)[4]	$105.4	$94.7	$94.5
U. S. Govt. Obligations Held (billions)[4]	$31.0	$27.3	$32.3
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	216.8	221.3	198.2
All Commodities[7]	119.1[1]	119.2	119.3
Commodities Other than Farm & Foods[7]	127.9[1]	127.9	125.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

WHAT'S
DIFFERENT
ABOUT
BRMCO



If you buy aluminum, brass or bronze in strip and rolls, you may think all suppliers are alike. They're not. No one supplier can be all things to all people, and few try. If you are the type of buyer who looks for something a little "extra" in quality, workability and service, you might make it a point to learn more about BRMCO. With BRMCO metals, uniformity of width, gauge and grain size results in greater efficiency and lower metal working costs. For example, BRMCO can hold temper tolerances to within plus or minus 3 points on the Rockwell scale.

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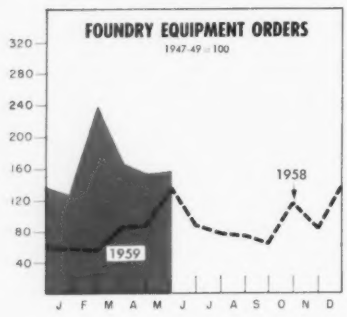
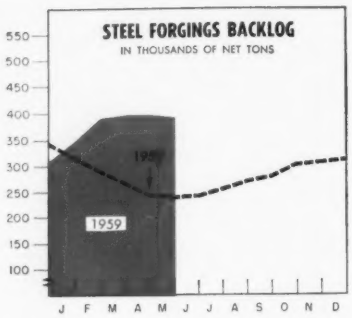
THE BUSINESS TREND





	1959	1958	1957
Jan.	127.4	57.9	117.9
Feb.	237.1	57.6	188.4
Mar.	166.6	85.9	127.0
Apr.	154.2	88.7	101.1
May	157.0	136.1	136.2
June	....	87.7	187.5
July	....	77.9	98.6
Aug.	....	74.1	231.3
Sept.	....	64.5	113.9
Oct.	....	118.9	145.3
Nov.	....	83.3	59.6
Dec.	....	137.0	61.4
Avg	....	89.1	130.7

Foundry Equipment Mfrs. Assn. Charts copyright, 1959, STEEL.

	Shipments 1959	Shipments 1958	Unfilled Orders 1959	Unfilled Orders 1958
Jan.	113	108	353	318
Feb.	113	93	392	289
Mar.	129	92	396	266
Apr.	136	83	398	242
May	142	78	394	240
June	....	88	...	246
July	....	67	...	256
Aug.	....	80	...	279
Sept.	....	89	...	287
Oct.	....	100	...	303
Nov.	....	89	...	307
Dec.	....	113	...	313

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

strike lasts over eight weeks, even this support will dwindle.

Auto production is maintaining its strength, but that won't last long. The industry supposedly has enough steel to weather a fairly severe strike, but model changeover period is here. By mid-August, auto production will be hardly noticeable.

Conclusion: A strike of eight weeks or more would push the Business Trend index down between 80 and 100, or roughly half of the record figure set only a month ago.

• **After It's Over**—Once the workers return to the mills, get set for a dramatic upsurge. From now on, a settlement will be followed by a rise in business to nearly record levels in two to four weeks. The longer the strike, the quicker and higher the economy will bounce. Even those economists who have held reservations about the last half of 1960 say that a six or eight week walkout in steel will push any possible recession well into 1961.

FRB Index Up in June

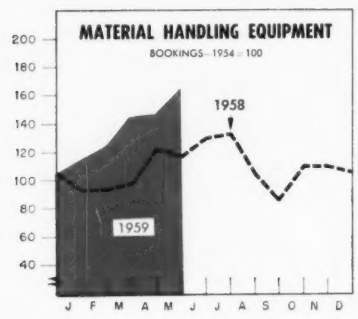
The more we learn about the industrial buildup prior to the steel strike, the more we realize how far we underestimated the basic strength of the recovery from the recession of 1957-58. The latest eye opener is the Federal Reserve Board's announcement that total industrial production in June expanded another two points to an all-time high of 155 (1947-49 = 100). This came on top of a three point advance in May and brings the recovery score since the low point in April, 1958, to 23 per cent. In the same span of the 1954-55 recovery, the gain was 13 per cent. In 1949-50, it was 37 per cent. (A 42 day steel strike in the early stages of that recovery added to its impetus.)

This June increase came despite a cutback in steel production. Large gains came in output of autos, household durable goods, and most types of business equipment. These raised the durable manufacturing segment to 159, three points above the May figure. This strong advance in metal fabricating was the main reason manufacturers were unable to build steel stocks as high as they wanted.

Strike to Hit Canada

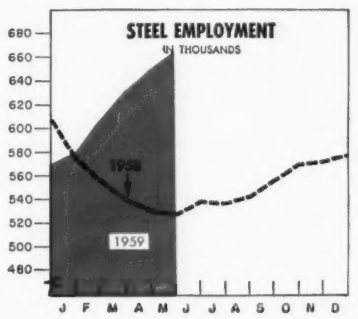
STEEL's correspondent in Canada sums up the effects in that country of a prolonged steel strike in the U. S. this way:

1. It could hit the building indus-



	1959	1958	1957	1956
Jan.	115.84	93 07	126.34	122.43
Feb.	124.77	93.49	139.29	129.56
Mar.	146.36	97.89	140 76	166.14
Apr.	147.28	122.36	132.67	145.20
May	164.45	118.04	157.95	155.53
June	.....	131.15	121.57	189.13
July	.....	134.34	128.31	165.50
Aug.	.....	104.46	110.09	168.70
Sept.	.....	85.41	116.79	130.35
Oct.	.....	111.35	124.80	143 38
Nov.	.....	110.88	87.80	138.50
Dec.	.....	105.97	105.65	117.76
Avg	.....	109.87	124.34	147.68

Material Handling Institute Inc.



	Employment in Thousands		Payroll in Millions	
	1959	1958	1959	1958
Jan.	584	575	$348.0	$297.4
Feb.	607	554	346.8	261.7
Mar.	631	539	400.2	271.8
Apr.	649	529	400.3	259.1
May	664	527	412.2	270.1
June	...	538	....	278.6
July	...	536	....	280.1
Aug.	...	542	....	299.1
Sept.	...	555	....	308.1
Oct.	...	569	....	341.7
Nov.	...	571	....	320.7
Dec.	...	577	....	340.7

American Iron & Steel Institute.

try, which is recovering from a slump.

2. It could cut into auto output.

3. It could curtail operations of Canadian fabricators of steel plate wider than 48 in.

4. It could throw steel production out of kilter next winter from lack of ore.

5. It will hit Canada's iron ore industry which is built up to supply raw material to the U. S.

6. It would undoubtedly push Canadian steel prices up.

V. W. Scully, president of Steel Co. of Canada, the nation's largest producer, says: "A strike of more than two or three weeks would be quite serious for us." Reason: Ore from Michigan and Minnesota mines, in which Stelco has interests, is completely cut off because the workers are members of United Steelworkers.

Business Failures Rise

Business failures rose 10 per cent in June over May, reports Dun & Bradstreet Inc. This contraseasonal rise brought the number of casualties to 1244, just 16 shy of the mark a year ago. However, liabilities continued to decline, totaling only $49 million for the month. That was the lowest figure in eight months and 20 per cent under the liability figure for June, 1958.

Most categories held close to the year-ago figures, but manufacturing showed a 14 per cent decline in number of failures.

Through the week ended July 9, failures have totaled 7971 compared with 8830 in the corresponding period of 1958.

Construction Gap Closing

Despite near record awards of construction contracts, the favorable gap to date over 1958's awards is closing. The cumulative total for the first 29 weeks of 1959 exceeds the corresponding year-ago total by 5 per cent. A month ago, the edge was 8 per cent.

Reason: Awards at this time last year were showing large gains after the industry snapped out of its recession. However, 1959's record is still second only to record 1956.

Engineering News-Record data show that private construction is carrying the load this year. Industrial building is up 47 per cent; mass housing, up 20 per cent; commercial building up 15 per cent; and unclassified private up 8 per cent, primarily because of gas pipeline awards.

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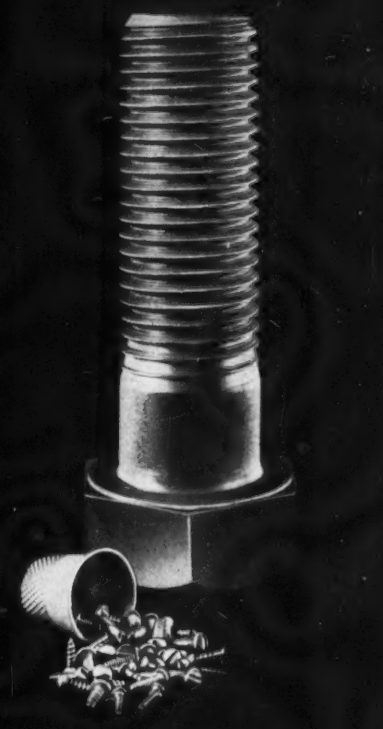

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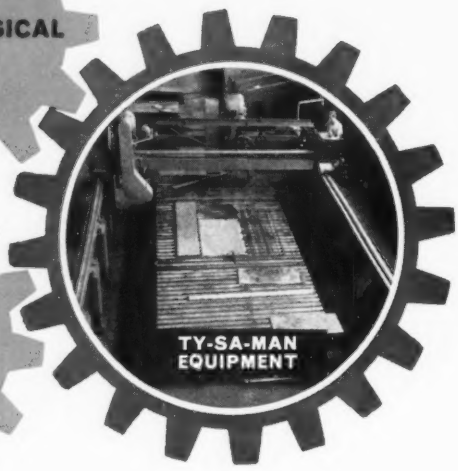

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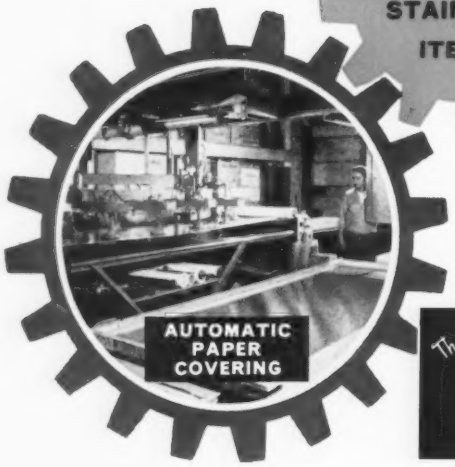

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HAROLD J. JUNGBLUTH
R T & E manager

Robert A. Barr was appointed general manager, Refractories Div., **Babcock & Wilcox Co.**, at New York. He was assistant general manager of Carborundum Co.'s Refractories Div.

John W. Eason was made manager, Baltimore Div., **Revere Copper & Brass Inc.** He was manager of Revere's aluminum industry sales in the New York executive office. Mr. Eason succeeds the late **Jack F. Croasdale. Arthur W. Wainwright** was made assistant manager at Baltimore. He was treasurer of the division, and continues in that post.

Daniel L. Wertz joined **Industrial Heating Equipment Co.**, Detroit, to develop and market a new line of automated batch type controlled atmosphere furnaces, soon to be announced by the company.

Richard W. Phelps was appointed general manager, Dilts Div., Fulton, N. Y., **Black-Clawson Co.** He was manager of engineering and product development for the division. Mr. Phelps succeeds **Robert J. Jacobs**, resigned.

M. Carl Haddon was appointed a vice president of **Lockheed Aircraft Corp.** and general manager of its Electronics & Avionics Div., Los Angeles. He succeeds the late **Dr. Louis N. Ridenour.**

John B. Hanson was made manager of metal-mesh belt sales, **Cambridge Wire Cloth Co.**, Cambridge, Md.

Weldon C. Miles was appointed president, **American Engineering Co.**, Philadelphia, subsidiary of United Industrial Corp. He was vice president-general manager.

J. E. Kunkler was elected a vice president of **Armco Drainage & Metal Products Inc.**, Middletown, Ohio, subsidiary of Armco Steel Corp. He continues as manager of the Central Div. at Middletown, in charge of activities in Ohio, Kentucky, and West Virginia.

Paul S. Nurko was made works manager, **De Laval Steam Turbine Co.**, Trenton, N. J. He was general superintendent, Mfg. Div.

Byron Nierenberg was made sales manager, Engineering Products Div., **McKiernan-Terry Corp.**, Dover, N. J.

Lee J. Wolf was made executive vice president, **Massey-Ferguson Inc.**, Racine, Wis. He continues as treasurer.

James E. Goodin was promoted from assistant superintendent to acting superintendent, Open Hearth Dept., **Granite City Steel Co.**, Granite City, Ill.

George A. Strichman was named director of manufacturing services for **Raytheon Co.**, Waltham, Mass., a new post. He resigned as manufacturing manager of General Electric Co.'s Small Aircraft Engine Dept.

James J. Gibbons was appointed director of marketing for **A. O. Smith International S. A.**, subsidiary of A. O. Smith Corp. With headquarters in Milwaukee, he will co-ordinate and develop sales of the company throughout its world markets. Mr. Gibbons was director-sales and advertising, Bostrom Corp.

Harold J. Jungbluth was named manager, Waukesha, Wis., operations, for **R T & E Corp.**, a newly created post. He was purchasing director of Oilgear Corp.

Edwin T. Goree was made vice president - sales, Koehring Div., **Koehring Co.**, Milwaukee. He was sales manager for commercial cranes and excavators at Bucyrus-Erie Co. **J. E. Chadwick** was made head of a new department to integrate sales to national and fleet buyers.

Bennett Industries Inc., Peotone, Ill., elected **L. A. Istel** vice president and assistant general manager; **W. R. Chapman,** vice president-general manager, Structural Div.; **J. B. Drever,** assistant secretary, controller, and assistant to the president; **R. R. Ernst,** vice president-sales manager, Container Div.; **W. R. Parsons,** assistant secretary, sales manager, and chief engineer-Structural Div.

Edward A. Margus was made assistant director of product engineering for **Cooper Alloy Corp.**, Hillside, N. J. He was chief design engineer.

Donald G. Sturges was promoted to associate director, Research & Development Div., **Carborundum Co.**, Niagara Falls, N. Y. He is succeeded as manager, New Products Development Branch, by **Frederick J. Ross Jr. Dr. Wingate A. Lambertson** was made assistant manager, Engineering Research Branch.

J. A. Crooks was made manager-heavy rolled product sales for **Beth-**

L. M. GILL

A. C. TOWNE

Michigan Oven president, chairman

MANUEL TAMA

MELVIN A. RANEY

Ajax Magnethermic executive posts

lehem Steel Co.'s Pacific Coast Div., San Francisco.

L. M. Gill was elected president, **Michigan Oven Co.**, Detroit, succeeding **A. C. Towne**, now chairman. Mr. Gill was sales manager.

W. J. Heinze was made assistant sales manager, **Alvey Conveyor Mfg. Co.**, St. Louis.

James T. Davies was appointed to the headquarters sales staff of **F. J. Stokes Corp.**, Philadelphia, as a specialist in ceramic and general industrial tableting equipment.

Stephen Miller was made sales manager; **A. R. Burke**, assistant sales manager, Machine Tool Div., **Clearing Div.**, U. S. Industries Inc., Chicago. **David L. Dumond** was made chief engineer, Machine Tool Div. He was formerly engineering manager for Cross Co., Detroit. Mr. Miller was with Union Carbide Corp., St. Louis. Mr. Burke was with Axelson Div., Los Angeles, U. S. Industries.

Manuel Tama was made vice president in charge of Ajax Engineering Div.; **Melvin A. Raney**, vice president in charge of Ajax Electrothermic Div., **Ajax Magnethermic Corp.** Both divisions are in Trenton, N. J. Earlier this year, the two Ajax companies were joined with Magnethermic Corp. to form Ajax Magnethermic Corp., Youngstown. Mr. Tama had been president of Ajax Engineering Corp. Mr. Raney was in charge of manufacturing for Taylor-Winfield Corp., Warren, Ohio.

John S. Kline was appointed general manager and chief executive of **Carpenter Steel Co.'s** Alloy Tube Div., Union, N. J., to succeed **P. L. Coddington.** Mr. Kline was assistant general manager. In Carpenter Steel's Metallurgical Dept., Reading, Pa., **Norman D. Groves** was named assistant manager-research in charge of chemistry and physics. **Neil J. Culp** was made assistant manager-research in charge of metallurgy.

Robert W. Matthews was appointed chief engineer of **National Pneumatic Co. Inc.** and its **Holtzer-Cabot Divisions**, Boston.

James F. Manning was made director of marketing; **Robert R. Stone**, controller for the Supplies Div., **International Business Machines Corp.**, New York.

R. B. Smith was made regional sales manager of **National Acme Co.'s** newly defined western district territory, including Canada. He has headquarters in Cleveland.

John E. Johnson was elected vice president and marketing manager, Electronic Data Processing Div., **Radio Corp. of America**, New York.

Carl L. Holverstott was made sales manager, Industrial Motor & General Section, **Delco Products Div.**, Dayton, Ohio, General Motors Corp. He succeeds the late **Roland R. Pees.**

La Verne W. Disney was elected vice president-treasurer, **Nichols Wire & Aluminum Co.**, Davenport,

DAVID L. DUMOND

Clearing machine tool-eng.

JOHN S. KLINE

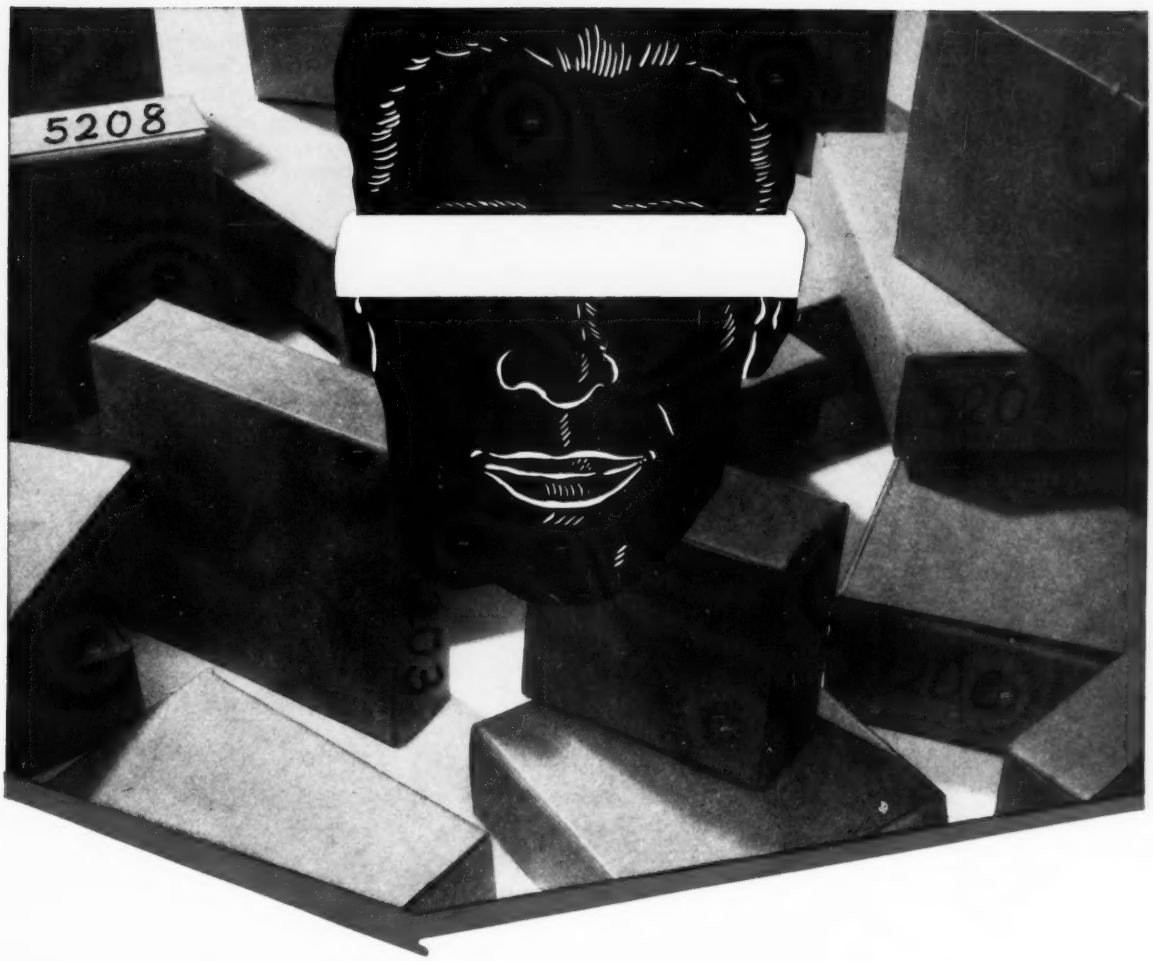
Carpenter Steel div. post

ROBERT W. MATTHEWS

National Pneumatic chief eng.

LA VERNE W. DISNEY

Nichols Wire v. p.



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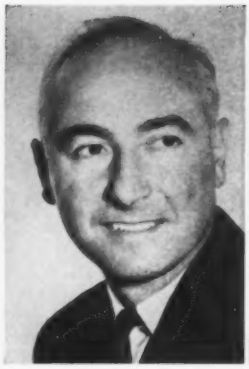
VIRGINIA: Richmond

GEORGE WAEGENER
Hyster Co. supervisor ind. eng.

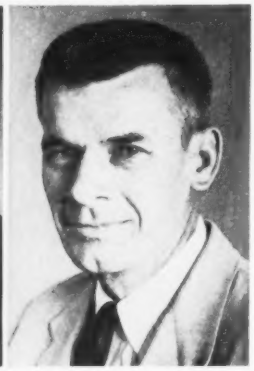


IRVING B. GRUBER
pres., American Forge

FRANK E. WHYTE
dir. purchasing, SKF Industries

JAMES N. F. REYNOLDS JR.
Van Norman v. p.-mfg.

LEE H. HILL
Burdett Mfg. president



MARTIN M. FISHER
Rheem Mfg. div. post

Iowa. He was treasurer and controller.

James N. F. Reynolds Jr. was appointed vice president-manufacturing, **Van Norman Industries Inc.**, New York. He was with the Management Consultant Div. of Scovell Wellington Co., and was works supervisor at Smith & Wesson.

Lee H. Hill was elected president, **Burdett Mfg. Co.**, Chicago. He succeeds **Mrs. Esther B. McCormick**, now chairman. For many years, Mr. Hill headed the Transformer Div. of Allis-Chalmers Mfg. Co. before becoming vice president. For the last 12 years, he has been a general partner in Rogers, Slade & Hill, New York management consultants.

John E. Lane was made sales manager, Clutch Div., **Dana Corp.**, Toledo, Ohio.

Donald B. Moritz was named vice president-general manager of **Waco Mfg. Co.'s** Cleveland Div. He was Cleveland plant manager.

Martin M. Fisher was made Chicago plant manager, Heating & Air Conditioning, Home Products Div., **Rheem Mfg. Co.** He was production manager.

Fafnir Bearing Co., New Britain, Conn., appointed **Horace B. Van Dorn** director of engineering, a new post. He was technical development manager, and is succeeded by **Henry Hubbell**, former chief metallurgist. **Howell L. Potter** was named assistant director of engineering; **Francis G. Patterson**, chief product engineer; **A. Burton Jones Jr.**, chief research engineer. **Philip K. Pearson Jr.** was made chief plant metallurgist succeeding **Mr. Hubbel.**

George Vingas, recently appointed foundry research engineer for **Magnet Cove Barium Corp.**, has been assigned to the Magcobar Foundry Div., Des Plaines, Ill. He will help formulate sand research projects to be undertaken in a new foundry research laboratory under construction at Rolling Meadows, Ill. Mr. Vingas previously served with Wehr Steel Co.

George Waegener was promoted to supervisor of industrial engineering at **Hyster Co.'s** Danville, Ill., plant. He was formerly plant engineer. Mr. Waegener will be in charge of all tooling, methods, and plant engineering work.

Irving B. Gruber was named president, **American Forge & Mfg. Co.**, McKees Rocks, Pa. He was vice president. Mr. Gruber succeeds C. W. Close Jr., who resigned to live abroad.

SKF Industries Inc., Philadelphia, appointed **Frank E. Whyte** to the newly created position of director of purchasing. Mr. Whyte will direct and co-ordinate the ball and roller bearing manufacturer's purchasing and traffic department activities. He joined SKF in 1957.

Lincoln Electric Co., Cleveland, elected **Robert A. Wilson, George F. Willis**, and **Edwin M. Miller** vice presidents. **George F. Clipsham** was elected secretary. Mr. Wilson is in charge of application engineering service, developing procedures, and techniques for applications of arc-welding. Mr. Willis heads the Electrode Mfg. Div. and Mr. Miller the Machinery Mfg. Div.

OBITUARIES...

Erwin Loewy, 62, founder and president, **Loewy-Hydropress Div.**, and vice president of the parent company, Baldwin-Lima-Hamilton Corp., died in New York July 13.

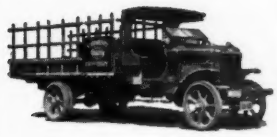
Robert A. Hogan, 56, former sales manager, Speedi-Dri Div., **Minerals & Chemicals Corp. of America**, Menlo Park, N. J., died recently.

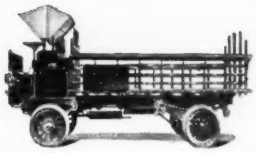
Wilber J. Shenk, 68, chairman, **Paterson-Leitch Co.**, Cleveland, died July 15 .

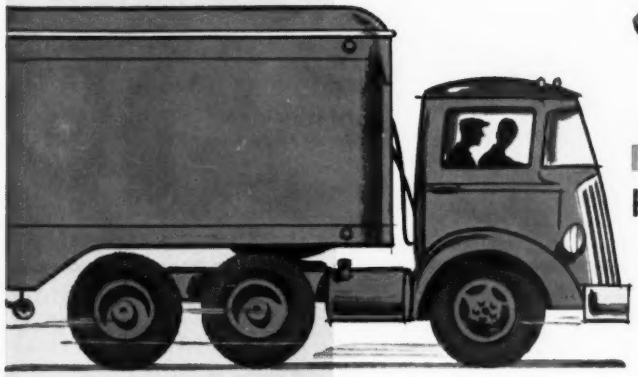
Albert H. Swift, 58, assistant Chicago district engineer, **American Bridge Div.**, U. S. Steel Corp., died July 8.

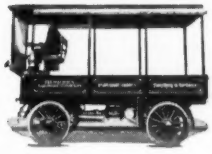
Albert I. Davey, retired vice president, **Empire Steel Corp.**, died July 5 in St. Petersburg, Fla.

Carlton B. Smith, 63, director of service for **Allis-Chalmers Co.**, Industries Group, died July 6.









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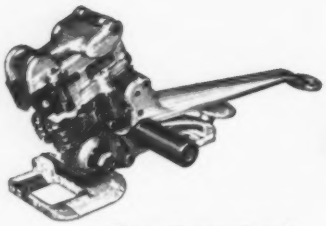

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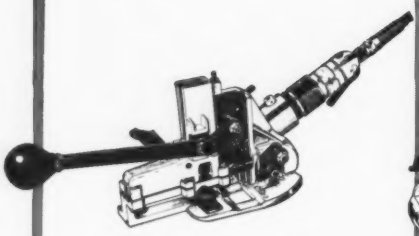
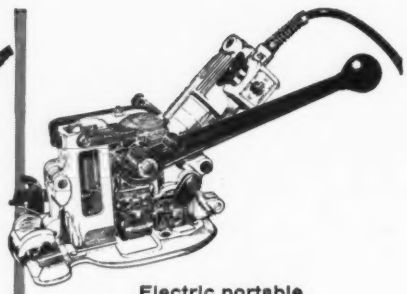
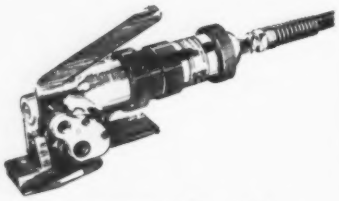


Air power portable strapping machines
AP Series



Electric portable strapping machines
AE Series



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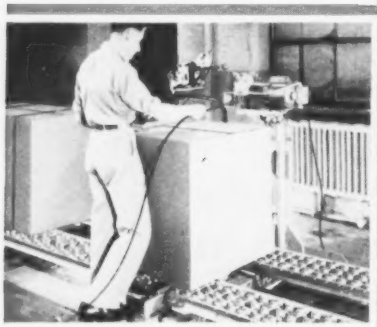
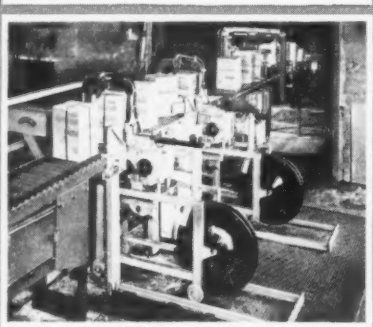
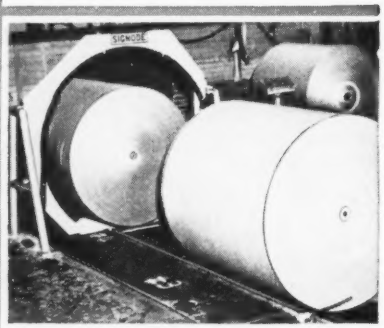


Power strap feeders
Model PSF



Fully automatic carton strapping machines—Model M2N



Fully automatic roll and coil strapping machines Model M20RB

Armco Boosting Capacity For Coating Steel Sheets

ARMCO STEEL CORP., Middletown, Ohio, is doubling the capacity of its Middletown Works to produce coated grades of sheets and strip. The firm has awarded a contract to Wean Engineering Co. Inc., Warren, Ohio, for construction of a 565 ft long continuous coating unit.

The new line will be able to coat 72 in. wide steel strip at 300 fpm. Capacity of the new line will be about 30 tons of coated steel an hour. It is expected to be in operation by the end of 1960.

• **Aluminizing Plans** — Associated with this new facility will be a conversion of a present zinc coating unit for the production of aluminum coated sheets and coils. The design of the new line also will provide for the addition of aluminizing equipment at some later date, says Clyde G. Davies, vice president-operations, Armco Div.

Installation of the new unit will necessitate many significant changes in buildings, cranes, and other facilities for storage and shipping.

Armco has six coating lines now: Two zinc coating units at the Middletown Works; two zinc coating lines at the Ashland, Ky., Works; and two lines at the Butler, Pa., Works which can produce either zinc or aluminum coated material.

Armco's coated steels are hot dip coated with molten zinc or aluminum by a continuous, high speed process which was developed by the company.

Reynolds Starts Potline

Reynolds Metals Co., Richmond, Va., has added about 33,000 tons to its annual primary aluminum production capacity with the start-up of the first of three potlines at its St. Lawrence reduction plant, Massena, N. Y. By the end of the year an additional 67,000 tons will be available at Massena, lifting the firm's total capacity to 701,000 tons.

Indications are that about one-third of the St. Lawrence plant's production will be delivered as molten metal to a Chevrolet foundry nearing completion close to the Reynolds plant. The remainder of the metal will go through additional production steps for sale in pig or ingot form.

The firm is adding new equipment and consolidating at its Richmond North Plant its coil winding facilities for foil gage and sheet gage strip conductor.

Enlarges Indium Capacity

American Smelting & Refining Co., New York, installed new facilities at its Perth Amboy, N. J., plant which increases its capacity to produce high purity (99.999%) indium. Increasing demand for the metal in electronic applications necessitated the completion of larger facilities than were available at its Central Research Laboratories, South Plainfield, N. J.

Builds Los Angeles Plant

Airline Welding & Engineering is building a $150,000 plant at 159th and San Pedro Streets, Los Angeles, Calif. The 38,000 sq ft building will house equipment for the manufacture of precision welding positioners and related tooling. It will also house a precision sheet metal fabrication shop and research welding laboratories for the investigation of welding techniques for new exotic metals, alloys, and complicated assemblies.

Alco Installs Furnace

Alco Products Inc., Schenectady, N. Y., has completed installation of an electric drop-bottom metal hardening furnace at its Thermal Products Div., Dunkirk, N. Y. Cost: More than $250,000. In addition to using the Lindberg furnace and its companion quenching and tempering facilities for missile bodywork, Alco has made the heat treating facility available to metal fabricators who may require hardening for other products.

Buys Casting Division

Metal Atomizing & Processing Corp., Trafalgar, Ont., subsidiary of Jacobus Mining Corp., purchased the Precision Casting Div. of Roberts Gordon Appliance Corp., Grimsby, Ont. The firm makes metal and alloy powders. A research program into precision casting, metal powders, and their application was launched late last year.

Improves Pipe Mill

Alberta Phoenix Tube & Pipe Ltd. has completed a $500,000 modification program at its pipe mill in Edmonton, Alta. Improvements include a complete redesign of the forming sections and incorporation of a normalizing unit and an ultrasonic testing unit into the production line. The firm normalizes all sizes of pipe from ¾ in. to 16 in. OD.

Enlarges Research Center

S&C Electric Co. will construct a building adjacent to its Ridge Avenue, Chicago, manufacturing plant. It will house all of the company's engineering and research offices and laboratories. The firm manufactures high voltage fuses, switches, and load interrupters.

Weir-Chicago Bridge Join

Chicago Bridge & Iron Co., Chicago, and G. & J. Weir Ltd., Glasgow, Scotland, have formed a jointly owned subsidiary, Weir-Chicago Bridge, to design, fabricate, and erect saline water conversion plants. The new firm, headed by William Vandersteel, resident manager of Weir's New York office, will have executive offices at 50 Broad St., New York 4, N. Y.

Ordnance Works on Block

The government is selling the Maumelle Ordnance Works, Pulaski County, Arkansas. Sealed bids are due Sept. 29. The 5213 acre installation was built in the early 1940s at a cost of more than $14 million. The sale will be handled

by General Services Administration's Region 7 office, Dallas. The property includes some 50 buildings, a standard gage rail line, a 20 mile roadway network, water distribution systems, a steam generating plant, complete fire fighting equipment, and road construction machinery.

Installs Extrusion Press

Kawneer Co., Niles, Mich., has purchased a 2200 ton Sutton extrusion press for installation in its Richmond, Calif., plant. The horizontal, hydraulic press will be used for the extrusion of aluminum architectural sections and components. Billets from 7 to 9 in. can be handled.

Joy to Build in Buffalo

Joy Mfg. Co., Pittsburgh, will erect a plant and office building in the Buffalo area at a cost of $750,000, nearly double that of a similar project which was halted last year. The site already has a $340,000 research and testing laboratory for the firm's Turbo-Dynamics Div.

Dow Plans Research Center

Dow Chemical Co., Midland, Mich., will build an agricultural chemical research center in that city. It will provide 50,000 sq ft of laboratory and office space in addition to greenhouses and service buildings.

NEW PLANTS

Leschen Wire Rope Div., H. K. Porter Company Inc., Pittsburgh, opned service center facilities at 1238 Fernwood Circle N.E., Atlanta 19, Ga. The building also houses the firm's National Electric Div.

Aluminum Extrusions Inc., Charlotte, Mich., is building a plant in Watsonville, Calif., to manufacture aluminum extrusions used in awnings, juke boxes, and dinette sets.

Electronics Div., Gabriel Co., Cleveland, is building a $1 million plant at Millis, Mass. Products to be made in the 70,000 sq ft facility include components for satellite tracking apparatus, infrared and space capsule antenna systems, and solar heat generators.

CONSOLIDATIONS

Titan Metal Mfg. Co., Bellefonte, Pa., has been merged into its parent firm, **Cerro de Pasco Corp.**, New York. Titan is a producer of brass and bronze free cutting rods; bronze welding rods; extruded brass shapes; brass wire; aluminum and bronze screw machine parts; brass, bronze, and aluminum forgings and pressure diecastings. W. W. Sieg will continue as president and chief executive officer of the Titan division.

Allis-Chalmers Mfg. Co., Milwaukee, acquired **Tractomotive Corp.**, Deerfield, Ill. J. W. Carlson is general manager of the new property, Deerfield Works, which is now part of the Construction Machinery Div. E. J. Mercer is vice president of the company and general manager of the division. Allis-Chalmers has also completed acquisition of Lakefield Mfg. Co., Wauwatosa, Wis., which will be operated as the Wauwatosa Works in conjunction with the Deerfield Works. K. J. Qualman is plant manager.

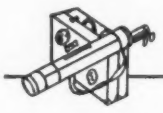
Thompson Ramo Wooldridge Inc., Cleveland, acquired controlling interest in **Magna Products Inc.**, Santa Fe Springs, Calif., producer of specialty chemicals and electronic instruments for the oil, gas, and chemical industries.

B & M Stainless Fasteners Inc., Malden, Mass., has been acquired by **Albany Products Co. Inc.**, South Norwalk, Conn., and will continue to operate as a wholly owned subsidiary. Inventories of stainless steel fasteners will be expanded while those of brass, bronze, and aluminum will be added as requirements develop.

Electric Steel Foundry Co., Portland, Oreg., purchased the **Pacific Alloy Engineering Corp.**, El Cajon, Calif., from Pelton Steel Casting Co., Milwaukee, and will operate the property as a subsidiary under the name of Pacific Alloy Corp. Joseph A. Blake is president of the subsidiary; W. H. Dunn, vice president and general manager; and Oscar Eggen, vice president.

Woodward Iron Co., Birmingham, acquired **Alabama Pipe Co.**, Anniston, Ala., and will operate it as a division under the direction of C. A. Hamilton Jr.

Standard Steel Corp., Los Angeles, acquired the **Cambridge Co.**, Lowell, Mass., from Carrier Corp., Syracuse, N. Y. With this purchase, Standard becomes a manufacturer of systems for the transportation and storage of missile fuels. The Los Angeles firm also makes chemical processing and cryogenic equipment and heavy road construction machinery. C. N. Rees, executive vice president, will serve as general manager of the new division.



VACATIONS

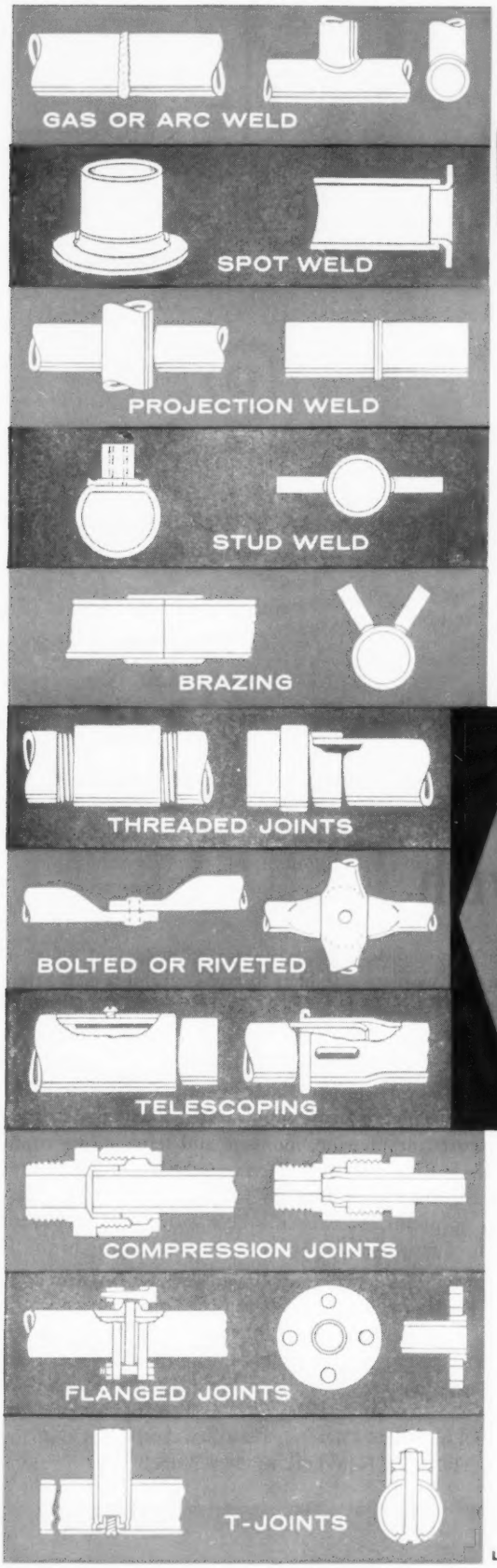
Warner & Swasey Co., Cleveland, will close its manufacturing plants in that city and New Philadelphia, Ohio, from Aug. 10 through Aug. 21, inclusive. During that period, no shipments will be made or received at these plants.

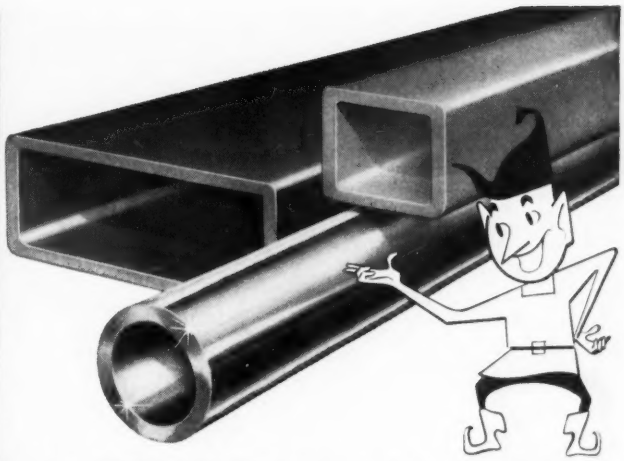
ASSOCIATIONS

Metal Powder Industries Federation moved its headquarters, effective July 28, to 60 E. 42nd St., New York 17, N. Y. Kempton H. Roll is executive secretary of the federation which comprises four trade associations and a technical organization: Ferrite Manufacturers Association, Metal Powder Core Association, Metal Powder Producers Association, Powder Metallurgy Equipment Association, and the American Powder Metallurgy Institute.

Alloy Casting Institute moved its offices to 1001 Franklin Ave., Garden City, N. Y. E. A. Schoefer is executive vice president.

Norbert P. Travers, sales manager for steel roof deck, Wheeling Corrugating Co., Wheeling, W. Va., was elected president of the **Metal Roof Deck Technical Institute**, Chicago.





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Technical Outlook

July 27, 1959

ELECTROLYTIC DRILLING IS NEAR—So says Lynn A. Williams, president, Anocut Engineering Co., Chicago. Most electrodrilling has been done by electrodischarge (a shower of controlled sparks bombards the workpiece). The new process, a relative of electrolytic grinding, will take advantage of electrochemical attack. Mr. Williams says that in electrolytic hole sinking in superalloys, the tool can feed at rates in excess of 0.3 in. a minute. Another advantage: There is no tool wear.

ELECTROLESS NICKEL ON MAGNESIUM—Immersing magnesium in a solution of nickel eliminates a complex electrode arrangement, says Dow Chemical Co., Midland, Mich. The process can coat the inside of tubing.

MOLYBDENUM VAPOR BARRIER— A method of selective freezing a molten solution plates molybdenum with chromium. Various alloys from copper-chromium to tin-chromium are used, says the Commerce Department.

MICROSCOPE SEES DEEPER—Metallurgists interested in crystal structures expect aid in probing metal mysteries from a new kind of microscope which will use protons instead of electrons to define an image. Electron microscopes are limited to a separating power of six Angstrom units—the new device is six times more powerful.

EXPLOSIVE TAPPING—Small electric furnaces are being tapped with explosives at Crucible Steel Co.'s Midland (Pa.) plant, says E. I. Du Pont de Nemours & Co. Inc. The method was formerly restricted to larger open hearths.

ALUMINUM NICKEL ALLOY— The best way to keep hydrogen out of aluminum is to introduce nickel, says Dr. J. E. Draley, senior chemist, Argonne National Laboratory, Lemont, Ill. His group developed an alloy (X-8001) by adding small amounts of nickel to aluminum alloy 1100. The 1 per cent nickel makes the aluminum far more resistant to the corrosive action of hot water in atomic reactors.

PRIVATE NUCLEAR DEVELOPMENT—Fifty-two power and light companies have formed a nonprofit group, High Temperature Reactor Development Associates Inc., to build and operate a pilot reactor. Private investment for large scale reactors will depend in part on economic feasibility studies by the group. Member firms will contribute up to $500,000 each during 1961 and 1962.

STRONGER LEAD COMPOUNDS— A new research program is aimed at making lead compounds six times stronger than unalloyed lead. The approach: Powder metallurgy and dispersion strengthening. Compounds which beef up lead's strength are dissolved in molten lead. Precipitation during cooling disperses the compounds quite evenly through the lead.

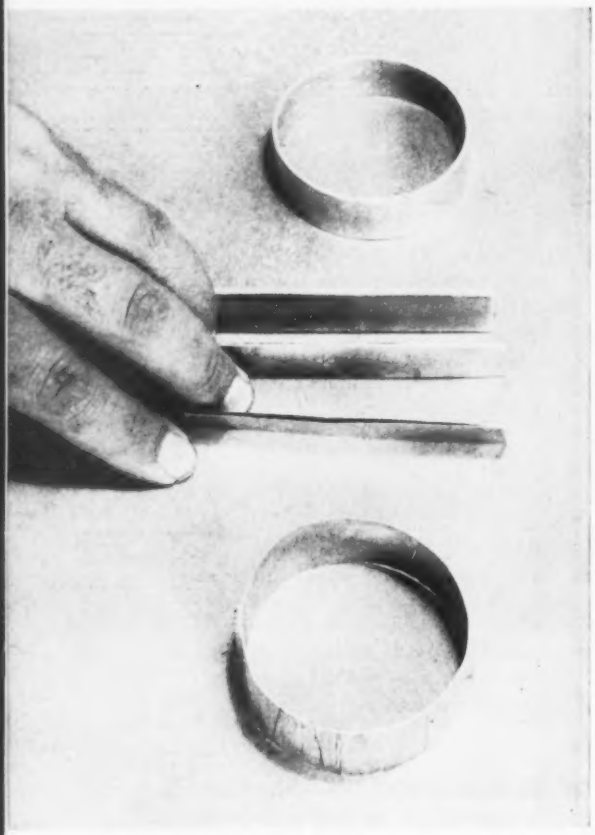
CODE FOR TITANIUM BOILERS— The ASME boiler code just issued paves the way for routine insurance coverage of pressure vessels and equipment made of titanium, says Titanium Metals Corp. of America, New York.

HIGH SPEED BEARINGS— Miniature bearings have passed tests at 400,000 rpm, says Fafnir Bearing Co., New Britain, Conn.

COATING IMPROVES METAL POWDER— By vapor depositing a coating on metal powders, you can get a number of property improvements, says Battelle Memorial Institute, Columbus, Ohio. Here are some it lists for nuclear reactor materials: Better conduction of heat; improved retention of fission products; insulation against reaction with other materials; superior strength compared with an uncoated counterpart.

Metalworking Outlook—Page 61 *Market Outlook—Page 143*

Inflatable, Seamless Metal Tubing Could Alter Many Fabricating Methods



Here's how Strubing is made. It starts as a base tube and is flattened. Additional rolling passes thin the tube wall. Last step is to inflate the material

The tubing can be inflated by air, hydraulic pressure, or mechanical means. Here's what the product looks like as inflation is started. Water pressure is being used in this setup

YOU WILL soon be able to purchase thin-wall seamless tubing in ribbon form and inflate it at the point of use.

Calumet & Hecla Inc. revealed last week that its Wolverine Tube Div. in Allen Park, Mich., will start experimental production this fall of Strubing (strip tubing).

The impact of inflatable tubing may be felt in industries as diverse as construction, electric power distribution, communications, rockets and missiles, farming, packaging, chemicals, and general manufacturing, says Calumet & Hecla.

• **The process used in making Strubing (cold rolling) provides an economical means of producing thin-wall tubing of materials and in thicknesses unavailable today, or available only at high cost.**

The point-of-use inflatability makes it possible to ship tubing economically; only the tube walls are shipped and not the hole. It might be possible to ship the entire ductwork for the heating system of a seven-room house in a box the size of an orange crate instead of in trucktrailer loads.

Other potential uses for the material in building and house construction include downspouts and electrical conduit.

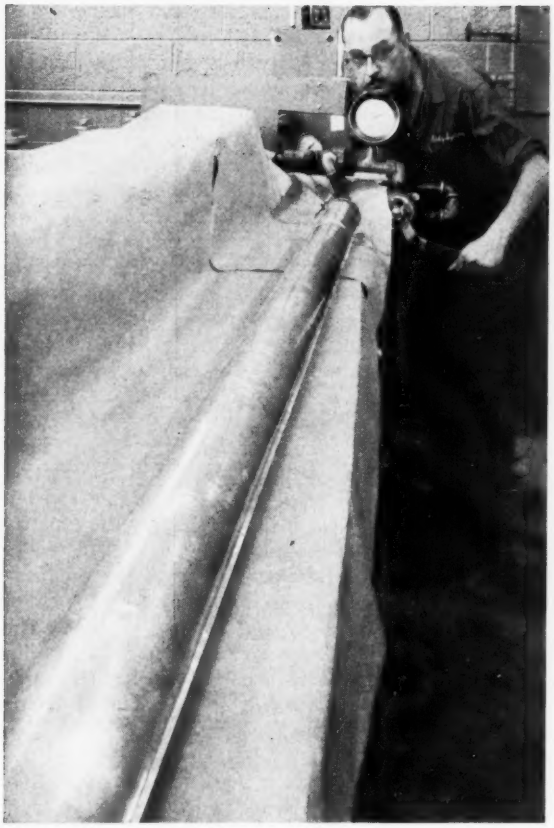
Because of its availability in long sections and light walls, it could simplify the problem of sheathing power distribution and communications cables.

• **Lining-by-inflation techniques might be used to construct low cost, corrosion resistant piping and vessels for the chemical, petrochemical, and process industries.**

It would be done by combining Strubing made of a corrosion resistant material and ordinary steel. Tantalum ribbon might be inserted in a pipe or tank and inflated to form an inner liner.

Company engineers believe that

it can be made in foil-thin or regular wall thicknesses, in small or large diameters. Shipped in ribbon form, it's inflated at point of use



Inflation has been completed. Ability to do this at point of use promises substantial savings in shipping costs. Only the walls are shipped, not the hole

First step in making Strubing is to pass base tube through rolling mill. Rolling flattens it and elongates it by making it thinner without changing inside diameter

the technique could also be used for repairing sewer and water mains. Strubing or other suitable material could be inserted and inflated to act as a protective inner tube.

• The material will prove useful for field irrigation pipe on farms.

On construction projects, it would fill the need for temporary field piping to transport water, fuel, and compressed air.

The product should provide substantial savings for manufacturing plants using thin-wall tubing. Shipped in compact rolls or reels, it could be unreeled, expanded, and cut to length on the line.

Typical uses for small-diameter Strubing might be for instrument lines, automotive tubing such as radiator, overflow, and thermostatic control lines, or for making the tubes for ball-point pens or mechanical pencils.

• Strubing of special metals such as stainless alloys, zirconium, titanium, tantalum, or columbium might prove to be of critical importance to the rocket and missile industry.

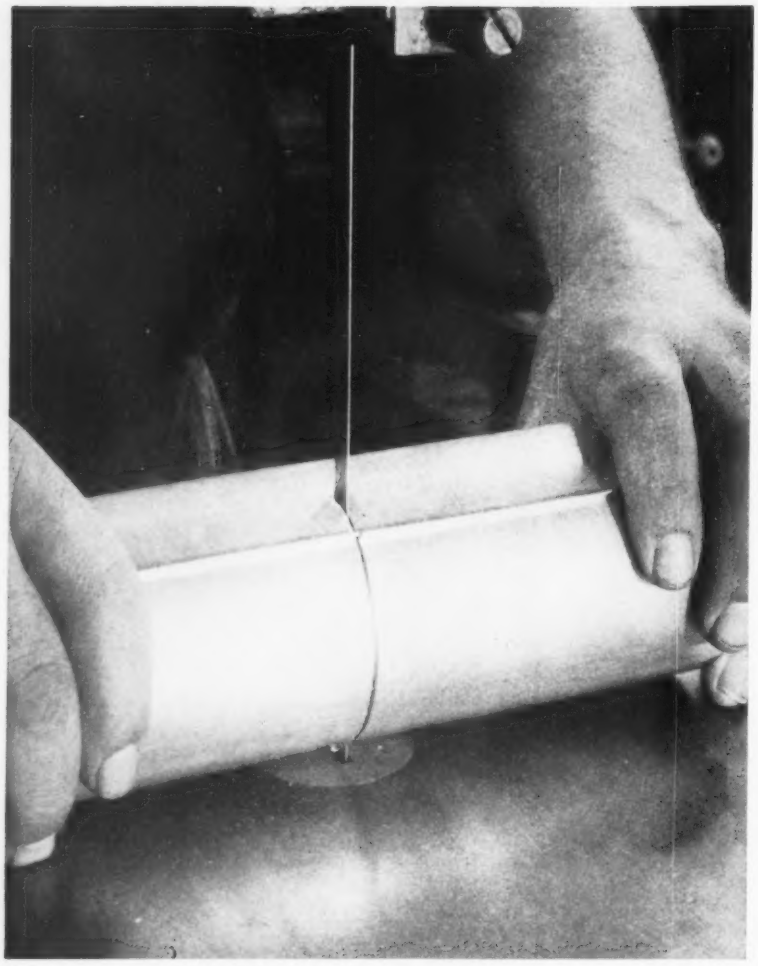
The product lends itself to the manufacture of light-wall, seamless rocket and missile bodies. Smaller diameter tubing would be useful for fuel lines.

• In metal-foil thickness, the product holds promise as a packaging material for frozen foods, for toothpaste or similar materials, or as a covering for food to be reheated.

It would be easy to insert a chicken in a length of Strubing and crimp the ends. Somewhat heavier walled tubing could be used by the canning industry. The availability of long sections makes the product ideal for continuous lines.

• The methods and equipment to be used for inflating the tubing will probably vary with the dimensions of the tubing and its application.

Calumet & Hecla engineers have



Once inflated, the material can be cut by conventional means. Here, a length of 3 in. diameter aluminum Strubing is being cut by a bandsaw

used hydraulic pressure, air pressure, and mechanical means to inflate the material. The thinner the wall, the lower the pressure required. In some sizes, Strubing can be inflated by tap water pressure.

Strubing can be made in sizes smaller than the lead in a pencil to pipe large enough for a man to walk through. It can be as thin walled as household metal foil or as thick walled as conventional pipe. It will be possible to ship the tubing in coil lengths of as much as 15,000 ft, the company says.

• The first step in making Strubing is to form a simple hollow shape by conventional techniques.

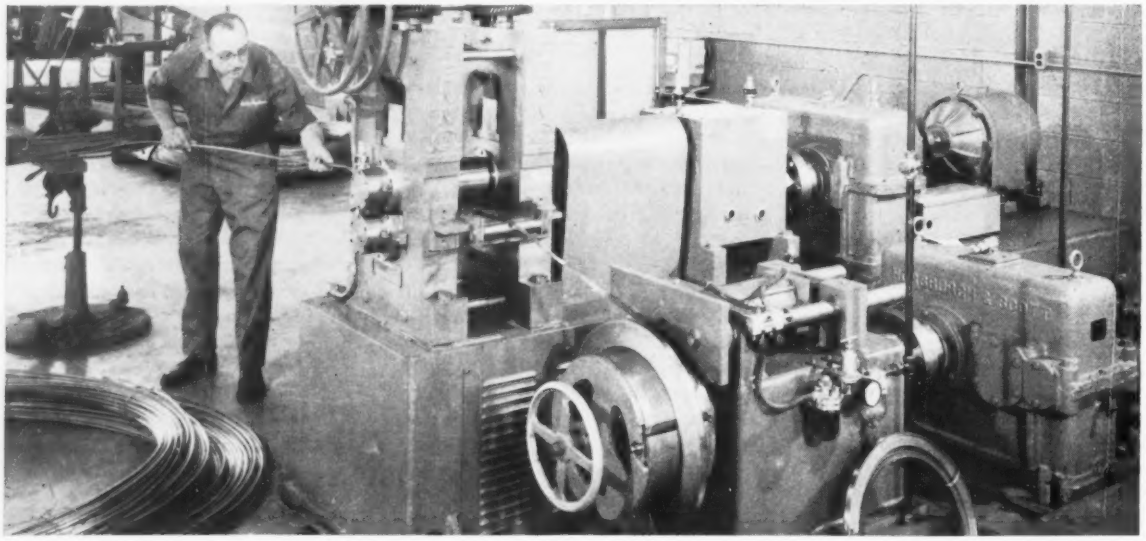
It is then passed through a rolling mill where it is flattened into ribbon form. The rolling process elongates the original tube by making it thinner without changing the inside tube diameter. The more passes through the rolls, the thinner the walls.

The diameter of the tube is limited only by the size of the starting piece, and the size of the starting piece is limited only by the capacity of the mill.

Inherent in the tubing produced by the rolling process is a pair of fins or ribs on the outside. The fins provide added stiffness to thin-walled tube. If desired, they can be removed as the Strubing is being formed.

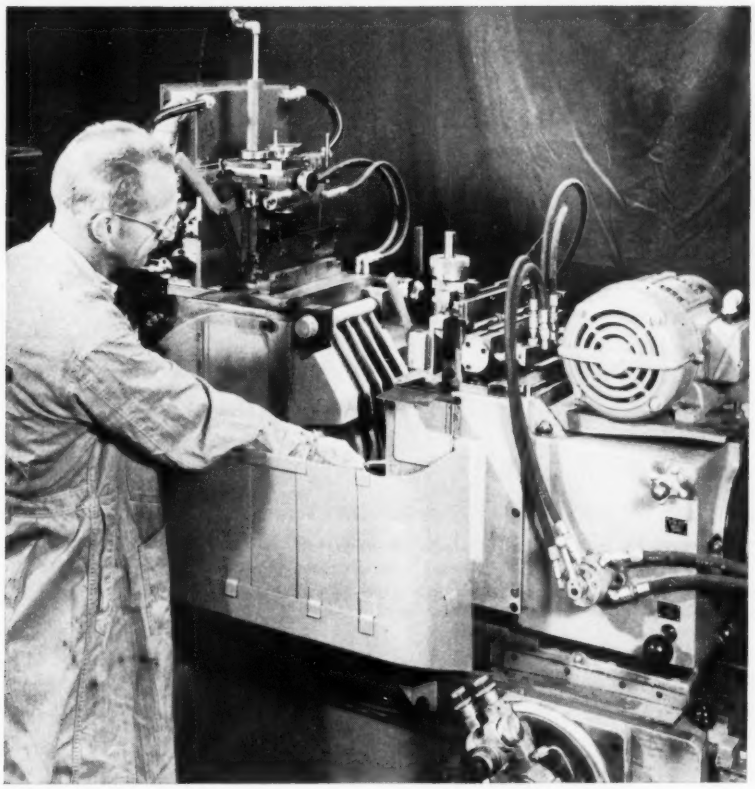
• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Copper Strubing is produced in this setup. Starting material is an 800 ft roll of ½ in. diameter tubing. Final product is a 3000 ft long coil of flat Strubing which, when inflated, makes ½ in. tubing with a wall less than 1/64 in. thick



Norton Puts Ideas to Work, Invades Centerless Field

Company managers expect new machine to be one of their best sellers. They figure rigidity will be a key to its success



An operator lays a part in place for centerless in-feed grinding. Support of both ends of the grinding and regulating wheel spindles is aimed at closer workpiece tolerances

CENTERLESS GRINDING machines are being made by Norton Co., Worcester, Mass., for the first time in its 60 year history of building grinding machines.

In announcing its No. 2 centerless, Norton feels it has put to work ideas gathered during the years it has supplied wheels for centerless machines and has used such machines in its own plant.

• **First Goal**—Rigidity of the grinding and regulating wheels came in for early consideration. The answer is a system that supports wheel spindles on both ends. Called Straddle Bearings, the supports prevent deflection normally encountered when an extrawide wheel is mounted on the end of an unsupported spindle. The extra support also counteracts the tendency for the spindle to deflect under heavy grinding pressures. The outboard bearing is anchored in the combination support and heavy wheel guard cover.

Norton engineers feel the Straddle Bearings enhance some grinding actions. Size and straightness control, they say, is more consistent since the wheels don't move out of position during the grind. Through-feed parts are more consistently sized, even though loading may be interrupted. Wheel truing is more accurate because there is no deflection under truing pressure.

F. Kenwood Jones, Norton's chief sales engineer, says that the new bearing design permits heavier grinding pressure, more consistent sizing on through-feed parts, and less truing because the wheel doesn't move under pressure.

• **Feed Innovation** — The Norton machine gets its feed by rotating a feed screw that moves the grinding wheel slide. The feed can be used for plunge grinding operations, or it can provide fine adjustments for sizing on through-feed operations. The adjustment is made on a handwheel with a click-count index graduated to 50 millionths of an inch, or by a long lever at the end of the machine.

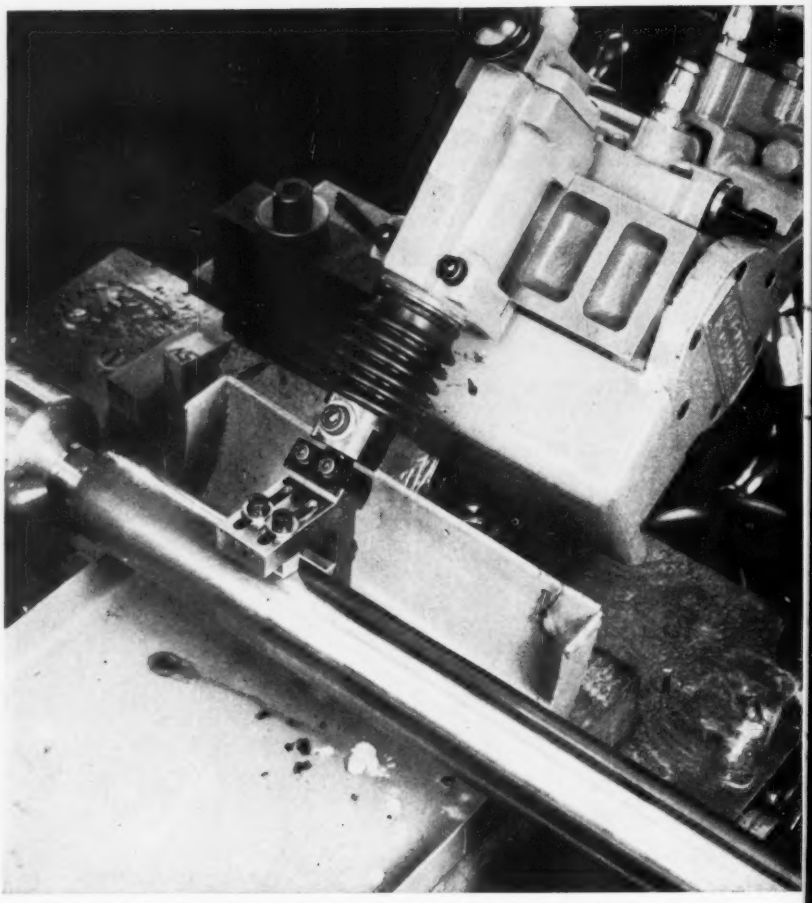
The regulating wheel head can be adjusted to accommodate different workpiece diameters, or to compensate for the reduction on regulating wheel diameter caused by normal wear and truing. The work rest is mounted on the regulating wheel head base. It swivels with the regulating wheel, eliminating extra adjustment when correcting for taper.

• **Transfer Alignment** — Since the grinding wheel feeds to the work, the work rest remains fixed. When two or more machines are set up in line for progressive operations, the original alignment of the machines and the conveying equipment doesn't have to be changed. As the grinding wheels wear, the wheel slides are moved closer to the work rests.

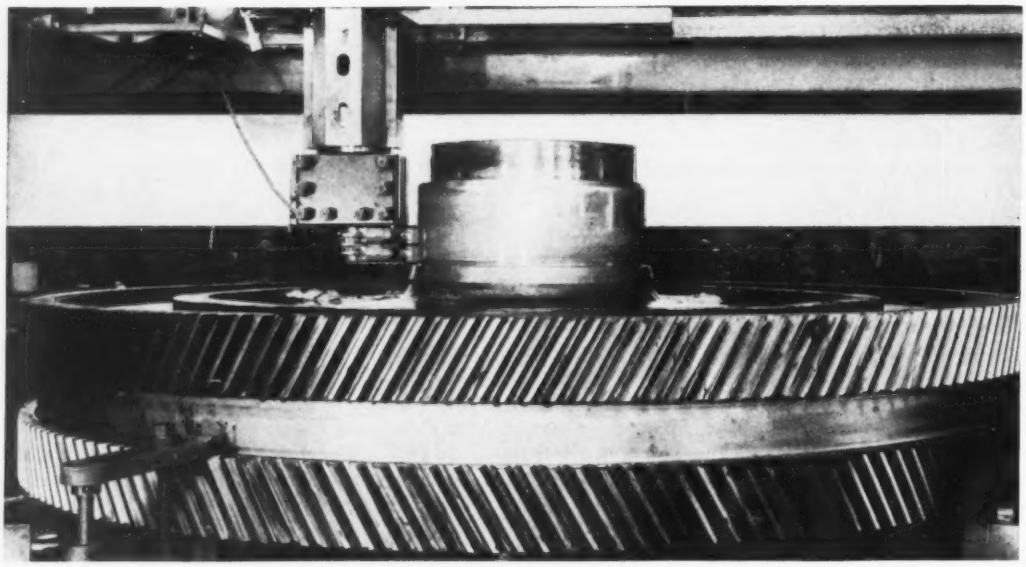
• **Payoff**—Norton expects the No. 2 centerless to be one of its best sellers. Robert D. Lawson, vice president and sales manager of the company's Grinding Machine Div., figures that some 60 per cent of all centerless grinding applications are within the size range of the No. 2.

Attachment Caresses Surfaces to A Controlled Finish

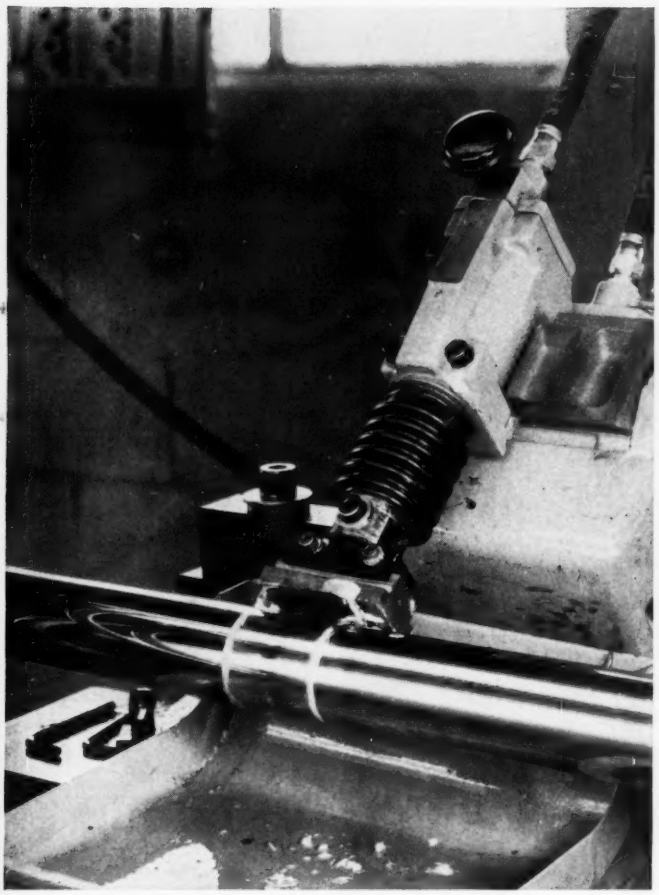
German process uses light pressures, high frequency oscillations to do superior job on many metals and nonmetallics. It also can improve geometry



At work on a high carbon, high chrome steel roll for a Sendzimir mill, the Supfina attachment first oscillates two diamond hones over the surface to remove grind marks and to provide an even surface



Two Supfina attachments are mounted on a vertical boring machine to finish the 36-in. diameter hub on a 23 ton gear. Finished hub averaged 3 microinches, gave 50 to 60 per cent bearing. Job time: 4 hours



Following the diamond hones, the Sendzimir roll is microstoned with an 800 and then a 1200 grit stone. The last operation here is polishing the surface with a felt pad and diamond paste

Mounted on a taper-fed cross slide, this microstoning unit is putting the final finish on a cone. Reflectivity shows the degree to which a finish can be refined

PRECISION surface finishes as fine as 0.5 microinch can be turned out with relative ease and economy by employing the microstoning process just announced by Taft-Peirce Mfg. Co., Woonsocket, R. I.

An inexpensive Supfina machine tool attachment, developed by Supfina-Wieck & Hentzen in West Germany, does the job. Taft-Peirce has been licensed exclusively to make and sell the attachment in this country.

• The process works on a wide variety of materials. It can also help correct defects in geometry.

Microstoning produces a superior surface finish, reducing both small roughness marks and the large feed and chatter pattern on a workpiece. In addition, an improvement in roundness can be obtained.

As far as T-P engineers know, any metal can be microstoned. Some plastics, hard rubber, and glass have also been handled. The degree of finish depends on the material. By finishing hard materials with diamond pastes, a virtually perfect mirror surface can be produced. Using abrasive stones only, finishes to 0.5 microinch average can be turned out in hard materials, 1 to 2 microinches in softer metals.

Another advantage: Since the stones shape themselves to the mean radius of curvature, there is a natural tendency to apply more pressure at high spots than elsewhere. This tends to correct parts that are out of round. The same phenomenon occurs when it's used on flat surfaces.

• Stones are placed against the work with light pressure (20 to 40 psi) and vibrated (2000 to 3000 times a minute) as the workpiece rotates.

The Supfina attachment can be used on lathes, boring mills, planers, or other suitable machine tools.

Compressed air drives a free-floating piston inside the head that moves in opposition to the body. The patented self-balancing principle allows the attachment to oscillate at high frequencies, free from externally transmitted vibrations.

Stone oscillation is parallel to the work axis. The work turns at speeds of 20 to 130 surface feet a minute for roughing, up to 400 sfpm for finishing. The traverse feed of the stone over the work may run 0.02 to 0.1 in. a revolution.

Two different models are available. The small one sells for about

$1400, the large one for just over $2000. Necessary auxiliary equipment is included.

• Microstoning is done in steps.

The coarseness of the first stone used depends on the initial roughness of the work. The progression to finer stones can be interrupted whenever the desired finish has been attained. The special stones are made in grit sizes of 60 to 1200. The coarse stones, to 180 grit, use aluminum oxide abrasives. Finer stones use silicon carbide. In addition, diamond hones can be used —also felt pads and diamond paste for polishing.

There are three different microstoning methods.

First, a stone can be chosen that will rapidly remove initial roughness, then automatically stop cutting because the surface becomes too smooth to dress the stone. This method is used chiefly for plunge cut operations. The process, however, will not remove deep local imperfections.

Second, stones can be used for dual purposes. Roughing at relatively slow speeds, say 50 sfpm, allows the stone to cut freely. Increasing the speed to about 150 sfpm tends to glaze the stone so it polishes the part without removing stock. The next rough workpiece dresses the stone again for cutting.

Finally, a stone is selected for continuous stock removal. The roughness produced keeps the stone sharp. This method is used when there is continuous traverse feed between the stone and the work. Surfaces produced this way are usually matte gray unless the process is carried through to superfine grit sizes. If a high polish is desired otherwise, it can be achieved with bakelite bonded graphite filled stones, or by polishing paste and felt.

Soft stones tend to wear themselves into their final shape, taking the contour of the part. For hard stones, the operator can insert a piece of coarse sandpaper, face up, between a nonrotating part and the oscillating stone. The abrasive paper dresses the stone to the part shape.

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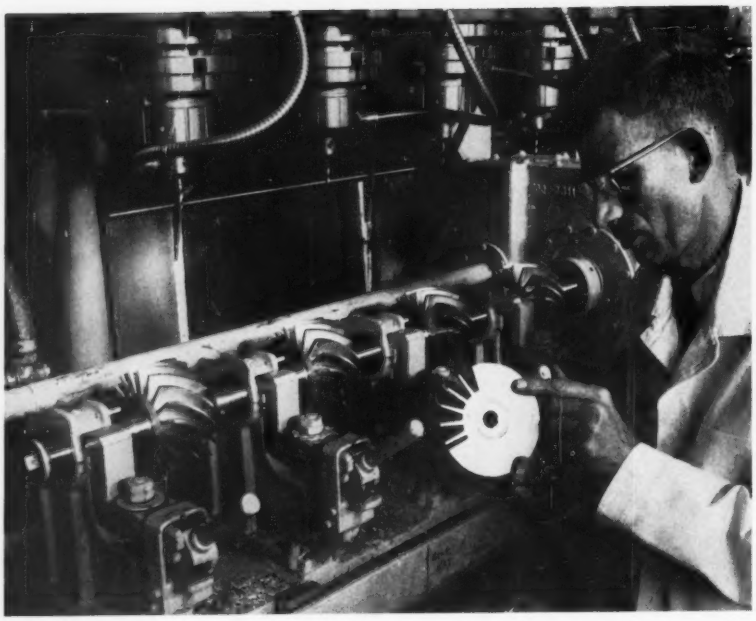


Boeing tool engineer Sam Ross holds partially milled turbine wheel blank. He devised a method to produce the complex part in one milling operation

Advanced Milling Technique Multiplies Output 48 Times

Putting special hydraulic controls on a self-guided mill turning out turbine wheels added a fourth axis and knocked one operation off a two operation process

COMPLEX multibladed turbine wheels, which once required 24 hours to produce, are completed in 30 minutes by a new system developed at Industrial Products Div., Boeing Airplane Co., Seattle.

The inducer wheels are used in the Boeing 502 series of gas turbine in marine, military, and industrial applications. Set into the front of the engines, they guide air into the compressor by high speed rotation of specially shaped blades.

Production formerly required a double process: One step to produce the wheels with flat blades; a second, time consuming process to attain the complex and slightly curved blade shapes necessary.

• Boeing tool engineer Sam Ross devised a method to do the job in one operation by adding special hydraulic controls to the self-guided milling machines on which the wheels are machined.

Normally, the standard milling machine operates in three axes—cutting horizontally, vertically, and in depth. Mr. Ross's system adds a fourth axis—a rotational feature which permits changing the angle of the inducer blades while being milled.

The mill, turning out four wheels simultaneously, completes the job in half an hour per part. The saving will be reflected in costs of the engine, says Boeing.

PRECISION® Quarterly NUMBER 2

PRECISION WELDER AND FLEXOPRESS CORPORATION, 3520 Ibsen, Cincinnati 9, Ohio

STAMPING RECORDS TOPPLE

Husky Flexopresses combine speed and accuracy to turn out cookware and "cookies" at unprecedented stamping rates.

★ *Manitowoc, Wis.* – An aluminum manufacturer is attacking rising costs with an "automatic weapon – peacetime style." it's a 50-ton Flexopress, owned by Mirro Aluminum Company, who declares it is "ripping out machine-gun rates of 680 component parts per minute,"–and shot the photograph above to prove it.

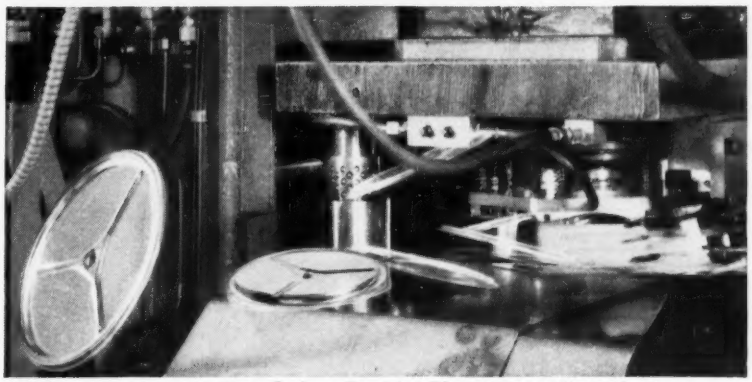
This is music to our ears, here at Precision Welder and Flexopress Corporation. And the Mirro news came right on the heels of record breaking news in the electric motor industry.

★ *Cookie Cutter* – In January, we shipped a 100-ton vertical Flexopress to a Michigan manufacturer of electric motors. He's using it to punch the slots and holes in 0.025 inch thick silicon steel "cookies" at a rate of 300 per minute. That's three times as fast as those silicon steel rotor laminations have ever been punched before.

Think what this advantage means to other motor manufacturers who can triple their production rates and cut costs, too. We know it can be done with Flexopresses. That press we shipped to Michigan punched 345 cookies per minute on its trial run and is *guaranteed* for 250 per minute.

★ *Ball Bearings* – Look closely at a Flexopress and you'll see why it does such jobs so swiftly and accurately. The ram rolls on preloaded ball bearing raceways (a patented Flexopress exclusive). They make every Flexopress a truly precision machine tool, no pun intended. The pre-loaded slides *don't even need clearance for lubrication.* When a press builder guarantees squareness of ram to bed to half a thousandth at any speed and stroke, that's precision, capital P or lower case.

Along about now, when you're thinking what presses like these could do for you, is just the time to call in the Flexopress sales representative and get the facts – fast and accurate.



680 lazy susan trays a minute fly from Precision Flexopress at Mirro Aluminum Company, Manitowoc, Wisconsin. (Actual stroboflash photo.)

Imaginative Handling = Profitable Presses

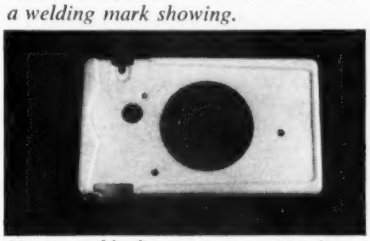
THE SUBTLE difference between a fine fast press and a fine fast press making a profit is precise material handling. This is why Precision has become expert at creating devices to get the stock in and the parts out as fast as Flexopresses can operate (and that can be awfully fast!).

Recently we put on our material handling hat for a really imaginative manufacturer. He wants a line that starts with a 40-inch mill coil of steel and ends with stampings big as an auto instrument panel stamped and stacked on pallets at a rate of 80 a minute. He's going to get it, too.

This really fantastic story can't be told–yet. But Precision is constantly building all sorts of other accurate and dependable devices to feed its presses. Flexofeed, for example (feed rate up to 2500 inches per minute, stroke up to 36 inches, accuracy to plus or minus 0.002 inch). Such devices share the credit for Flexopress records.

VINYL MARKET AWAKENS

MANUFACTURERS ARE just beginning to discover how much the warmth, texture and color of vinyl clad steel can enhance their products. Especially, they like the way this new material can be formed first, and then welded *without a welding mark showing.*



Not a weld shows on magnetic force welded radio case of vinyl-backed steel.

Precision Magnetic Force welding equipment does this tricky job, working from the back (bare) side of the metal. The welding current travels in and out of the same metal face and never touches the coating at all!

Automobile trim, radio cabinets, metal furniture, business machine frames, sports equipment – you're going to see a lot more of this sort of thing with the look and feel of leather, and the strength of hidden weld construction. When you do, look for a Precision welder behind the seams.

Possibly you missed–

These objective articles about other Precision developments:

- ☐ European Foil Butt Seam Welding Process Comes to U. S., **American Machinist,** June 30, 1958
- ☐ Automatic Welding – Forming, **Production,** November, 1958
- ☐ Where Stamping and Assembly Meet, **Steel,** June 18, 1956

Or want more information about these:

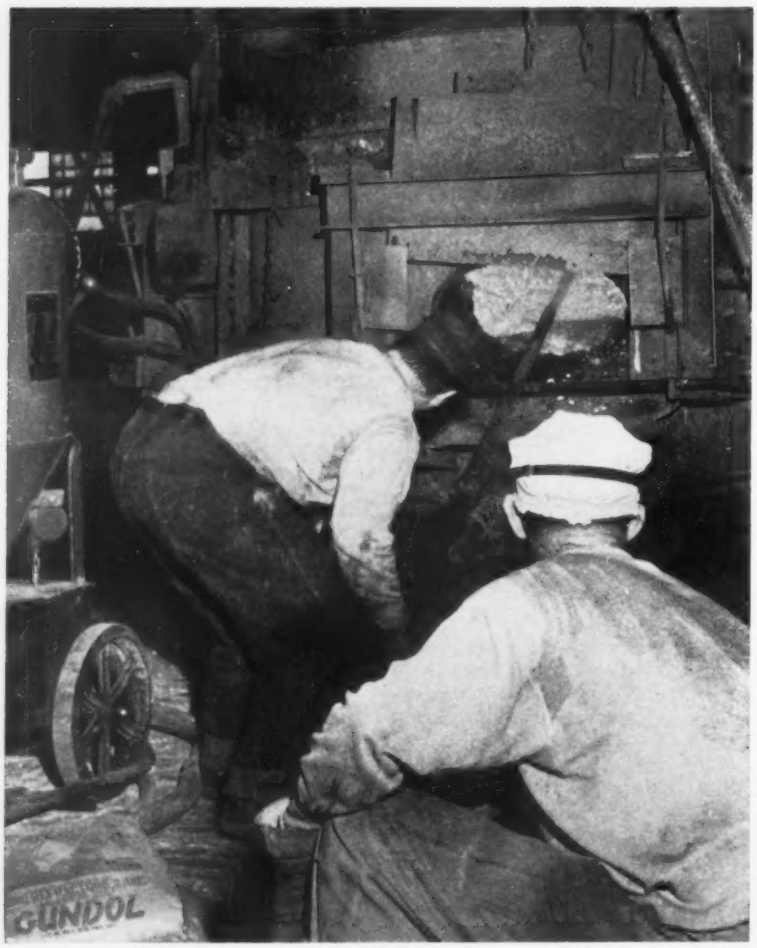
- ☐ Precision Magnetic Force Welders
- ☐ Precision High Speed Flexopresses

Check off what you want and let us know. We'll oblige.

Gunned Materials Increase Lining Life in Electrics

By RALPH E. FORSMAN
Service Engineer
Basic Inc.
Cleveland

Refractories are blended with water in a nozzle mix gun and applied by the furnace crew between heats. They're sprayed on thin spots in the furnace lining, to balance wear, so all parts fail at the same time. The materials are often used to delay major repairs, so they can be planned properly. Lining life is often doubled; that means lower labor and material costs, fewer shutdowns



STEELMEN are looking for ways to reduce the cost of operating and maintaining electric furnaces.

They're finding, for example, that furnace lining that's kept in repair with gunned refractories lasts through twice as many heats as it would without patching. Lining cost per ton of steel produced might be cut as much as 40 per cent.

• Gunned refractories make for even wear in all parts of the furnace lining and delay shutdowns until major repairs can be made conveniently.

Sidewalls can be maintained indefinitely by gunning, but that's not always economical. Gunned refractories are most valuable for repairing weak spots, so all parts of the lining wear out at the same time. Such practice should double lining life over that obtained without gunning.

Sometimes a large section of the furnace lining drops out. It's not convenient to shut down the furnace immediately for repairs. It can often be kept in operation a week or more with gunned materials, so the shutdown can be anticipated.

Use of gunned refractories to repair tap holes, bottoms, and banks makes for less hard work in maintaining the furnace, by eliminating most shoveling of granular materials.

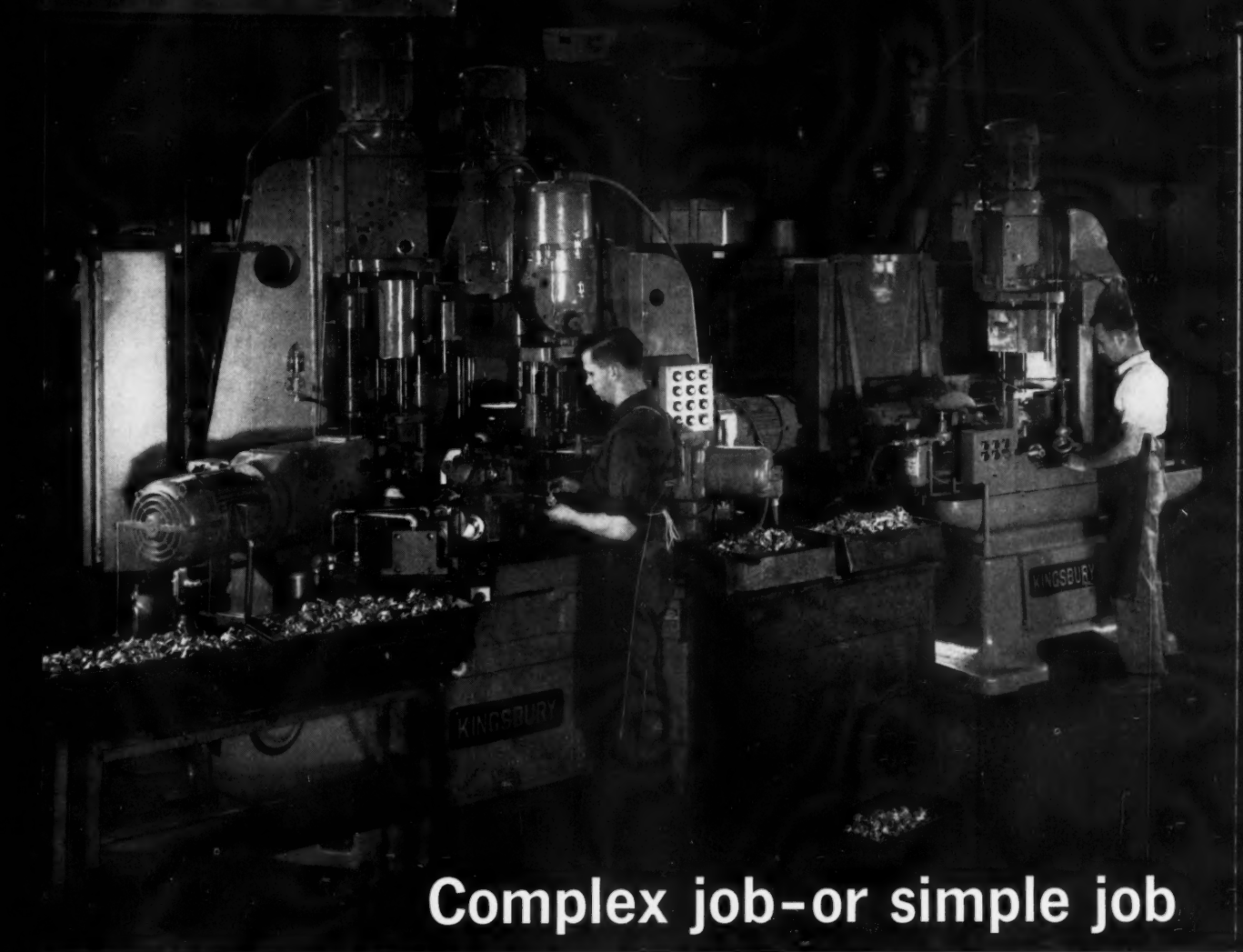
Gunning is also more accurate. Little or none of the material is wasted. And it doesn't land where it isn't needed, decreasing furnace capacity. Accuracy is extremely important in adding refractory material to the larger electrics.

Bricklaying costs can be cut in half by extending lining life, and dolomite-magnesite gun refractories cost less than half as much as basic brick.

Gunning is done by the furnace crew. One man should be responsible for keeping equipment in good condition, but that's only a part time job for a millwright. Gunning in multiple furnace shops should be done by a specially assigned crew. In small shops, it could be done by the furnace crew.

• Longer campaigns mean savings in labor and material, as well as increased productivity.

In a typical operation, gunned re-



Complex job–or simple job

Kingsburys save money on both

600 valve castings per hour gross with a 14-spindle indexing machine

At the left is high production with a variety of tools — five combination tools, two drills, a hollow mill, a recessing tool for the undercut, a counterbore and three taps.

A 30-inch index table holds seven fixtures. Steel jaws in each fixture hold two parts, one in front for the first chucking and one in back for the second. A spring-loaded ram clamps the parts and an air cylinder unclamps them.

Nine self-contained units perform the operations. Seven have single spindles. Two vertical units have multi-spindle heads; each operates at two stations and in both chuckings.

The machine also handles a part with another tapped hole. The units cycle in 4.5 seconds, and the table indexes in 1.5 seconds, so a part can be finished every 6 seconds.

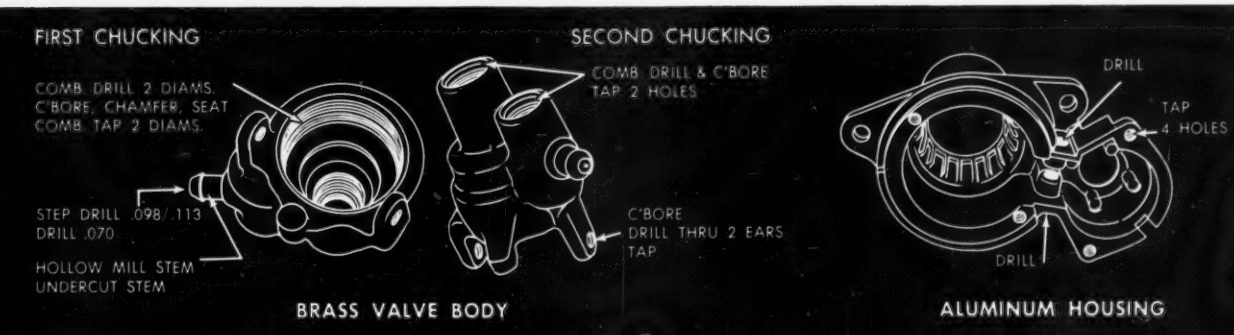
325 aluminum housings per hour gross with a 6-spindle non-index machine

The machine at the right has one fixture. Clamping is manual. Two opposed units drill two holes in line. To avoid tool clash one unit cycles, then a cam-controlled valve trips the other. A vertical unit taps four holes.

Kingsbury machines save money because they produce uniform parts that gage. Good basic design and rugged accurate construction mean few rejects and little down time.

Kingsbury Machine Tool Corporation, Keene, N. H.

KINGSBURY MULTI-UNIT AUTOMATICS



BRASS VALVE BODY

ALUMINUM HOUSING

fractories would double the number of heats of steel per campaign.

Allowing 16 hours for a shutdown, with overhead at $200 an hour, relining material at $3000, and bricklaying costs at $640, the bill for repairs is $6900.

Using 6 lb of gunning material per ton of steel produced, a 50 ton electric furnace would use 60 tons of refractories per double campaign. At $70 per ton, the material would come to $4200. Saving: $2700 for the double campaign.

Elimination of 16 hours downtime for brick repairs halfway through the campaign, and another 16 at the end of the campaign, makes possible the production of 400 to 500 more tons of steel. That means an increase of 8 per cent or more in steel production from available facilities.

• Dry mix, or nozzle mix refractory guns are most popular for electric furnace repairs.

Dry refractory material, containing soluble chemical bonds, is stored in a pressurized hopper. A valve at the bottom of the hopper allows material to drop into the shooting chamber. An air jet blows it through a hose to the nozzle, where it's mixed with water and discharged.

The right refractory, properly mixed with water, adheres to hot furnace walls, banks, and slag lines. Most gunning is done right after the furnace is tapped. Water content must be decreased gradually to allow for changing temperatures in the furnace.

Stationary or wheel mounted guns are available. Some have water pumps or tanks to compensate for low or unreliable water pressures.

Some guns have double hoppers to produce a continuous flow of wet refractory, but most furnace operators like the single hopper, batch type gun. The guns hold 5 to 20 cu ft of dry material. They can shoot less than 50 or more than 400 lb of refractories per minute, depending on the hopper pressure used.

• Several types of basic refractories are available for gun application.

All gunning refractories—dolomite - magnesite, magnesite, or chrome-magnesite—must be properly sized and bonded. If not, they'll rebound from the patched area, or pull away from the furnace walls as they dry.

Dolomite-magnesite materials are the most popular and the least expensive. They're usable in nearly every electric furnace maintenance application. Content: Coarse particles of dead burned dolomite and ground magnesite.

A number of good magnesite gun refractories are available. They're also used for patching upper banks and sidewalls, or for piping tap holes, but they're more expensive.

Chrome-magnesite gun refractories, popular for open hearths, are used less for electrics. Some material falls on the furnace banks during gunning; presence of chrome refractories on the banks isn't desirable during most electric furnace heats. And the chrome-magnesite materials are more expensive than dolomite-magnesite refractories.

• Slag lines and sidewalls should be gunned between heats. During shutdowns, a general buildup can be applied to the furnace lining.

Slag lines should be patched immediately after the furnace is tapped. The refractory mix must contain enough water to shine momentarily after it's placed. Large holes in slag lines or bottoms can be repaired successfully, even while the furnace is hot.

Sidewalls should be patched if they need it. Often the roof of the furnace must be lifted to allow fumes and dust to escape. That gives the operator a better view of the furnace interior.

Sidewall patches shouldn't be more than 2 or 3 in. thick. Projections must be avoided; they would fall off as the patch hardens, or they would be knocked loose when the furnace is charged.

The amount of water used depends on furnace temperature. If too much is used, patch material will run down the sidewalls. Too little water creates a dusty atmosphere in the furnace, so refractories won't stick to the walls properly.

Tap holes are lined by placing a pipe on a pad of wet refractory previously packed into the old tap hole. The opening around the pipe is closed at the back with bricks or steel plate, and material is gunned around the hole by shooting from the door of the furnace. The refractory should be wet enough to fill irregular spaces. When the cavity around the pipe is nearly filled, water content should be reduced to stiffen the patch, so it will set properly.

Often when the furnace is shut down, a coating of dolomite-magnesite, 2 to 3 in. thick, can be gunned over the entire lining. The coating lasts as long as two weeks; during that time, bricks don't erode. That permits substantial savings in lining cost.

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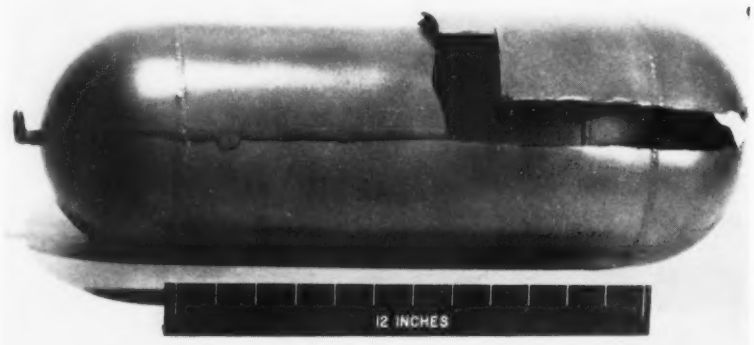
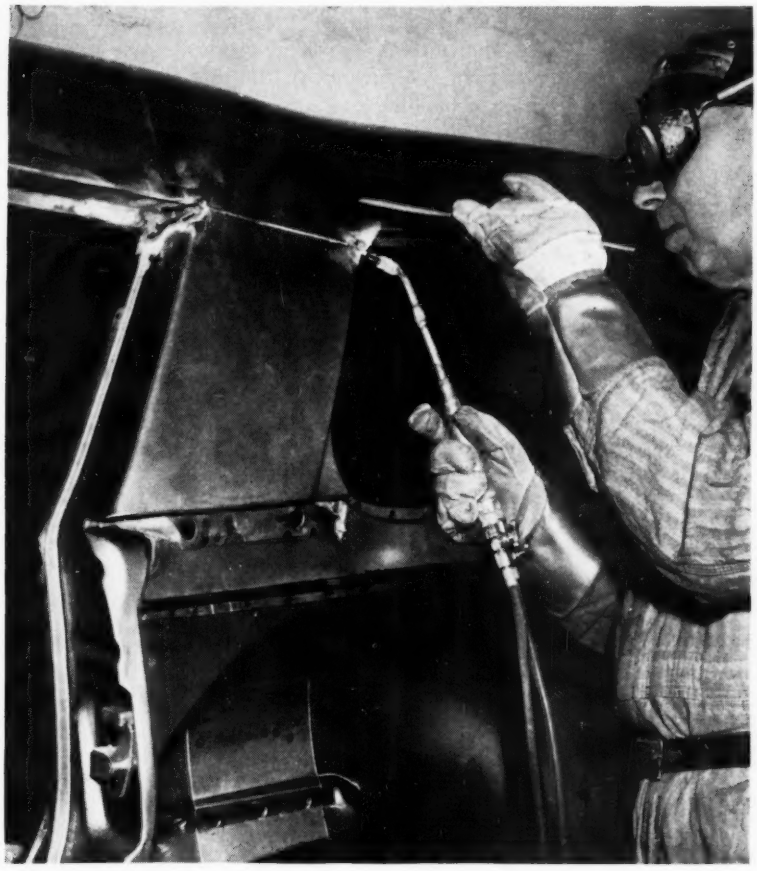


THIS WELDED STEEL VESSEL withstood 270,000 psi before it failed. It was made of Allegheny Ludlum Steel Corp.'s 0.048 in. "Potomac A" steel, heat treated to 50-51 Rockwell C. At temperatures up to 1000° F, its physical and mechanical properties are believed to be higher than those of any alloy under consideration for aircraft use

BRAZE WELDING adds strength, helps prevent squeaks, leaks, and rattles in Rambler's all-welded, single-unit construction of body and frame.



Extension side roof and roof panel on a Rambler Cross Country station wagon being joined by oxyacetylene braze welding with Anaconda-997 (Low Fuming) Bronze Rod. Braze weld between rear quarter pillar and side roof rail (to left) is one of several made primarily to prevent water leakage. American Motors welding engineers have found braze welding with Anaconda-997 (Low Fuming) Bronze Rod to be an efficient and economical production tool. The alloy bonds to steel easily. The relatively low application temperature minimizes distortion and makes it easy to control weld metal. Welding operations on a moving assembly line are fast, and finishing time is reduced. The rod's low fuming characteristics make normal ventilation facilities adequate.

There are up to 30 areas, depending on the model, where braze welding is used to augment electric welding to give American Motors Ramblers an all-welded, single-unit construction of body and frame with high strength, safety, and quiet operation. American Motors claims for this construction elimination of squeaks and rattles, also better utilization of space and greater durability.

OXYACETYLENE braze welding is being used increasingly for economical assembly of many steel articles which do not lend themselves to joining by arc welding or resistance spot welding. Applications range from auto bodies and appliance cabinets to frames for bicycles. In most cases, Anaconda distributors can help you select the rod for your job. But if you have a special problem, Anaconda welding engineers are at your service. Write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

59729

ANACONDA®

WELDING ROD AND WIRE

Made by The American Brass Company

Bertsch & Co. finds solution to lubrication problem–

RYKON

Centralized lube system pumps grease through 80 ft. lines in cold temperature; no clogging

Problem: Bertsch & Company, Cambridge City, Indiana, makes pinch rolls and other metal bending equipment. Some Bertsch pinch rolls bend plates 4¼ inches thick by 16 feet wide for use in atomic submarines. Bearings on this big Bertsch machine share a bending pressure of 4.2 million pounds. A centralized lubrication system used on one pinch roll model had to pump grease 80 feet. Greases tried could not be pumped this distance without clogging lines. Since machines are shipped all over the world and are often in operation in cold climates, Bertsch had additional problems. The grease had to be

Sons of founder. Harry E. and Robert O. Bertsch talk with Standard Oil lubrication specialist Donald M. Simmons. Don is well qualified to work with customers on difficult lubrication problems. He has the training and experience for it. Don graduated from Purdue. He has 7 years service with Standard, has completed the Standard Oil Sales Engineering School.

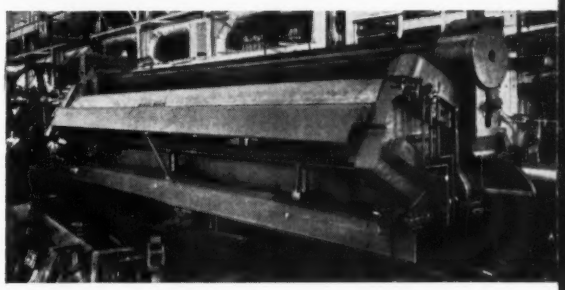
with Standard Oil's

Grease R

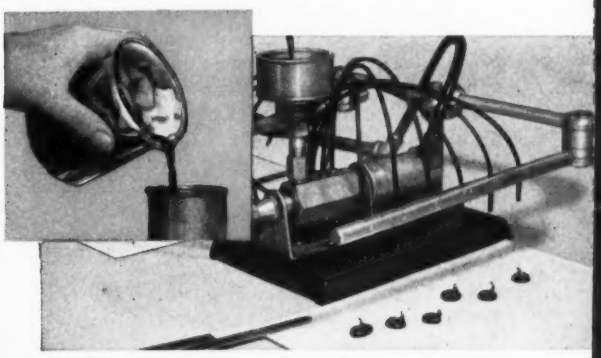
pumpable in cold temperatures. It had to be foolproof so that customers beyond the reach of service calls would experience no problems. Equipment had to uphold Bertsch's eighty year reputation.

What was done: Bertsch turned to Standard Oil for help. They have been customers of Standard's for 69 years, so the move was logical. And Standard Oil man, D. M. Simmons had the answer. RYKON Grease R. This is a rheopectic grease, one that flows like an oil. Its rheopectic properties cause it, under slight shearing stresses, to turn to a thick, durable grease. RYKON Grease R flows as a fluid to the pump through the equipment's central lubrication system. There it lubricates the bearings as a grease.

What you can do: Maybe you manufacture equipment that needs a centralized lubrication system and you have been looking for a grease like RYKON R. Maybe you operate equipment with centralized lubrication systems. Then you need to know about RYKON Grease R. Get the facts from your nearby Standard Oil lubrication specialist anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**



A Bertsch 80 ft. pinch roll, largest on record. RYKON Grease R is used in the central lubrication system of this giant unit.



Lab demonstration shows how RYKON Grease R works. Grease is poured into reservoir as a fluid. The shearing action exerted by pump and outlets irreversably converts fluid to a grease. Grease is ejected from outlet lines as in lubrication system.

STANDARD

You expect more from Standard and you get it!

Chemical Milling Gets Set For Shift to New Metals

A relative newcomer to machining, the process is already making the transition from success in aluminum to production in high property materials

CHEMICAL milling, a freshman in the metalcutting business, already is facing up to a postgraduate challenge, the machining of high strength, heat resistant materials.

As supersonic aircraft make the transition from aluminum to these materials, chemical milling gives promise of keeping up.

A report on a thorough study conducted for the Air Force by Curtiss-Wright Corp's, Aeronautical Div., Wood-Ridge, N. J., shows how this young machining method stands.

• High strength alloy chemical milling already is in production.

Seven major chemical milling installations have been put to work in the new field. The materials include both aluminum and magnesium alloys (where chemical milling got its start) plus alloy steels AISI 4130 and 4340, and stainless steel types AISI 301, 310, 321, 347, 402, and 410. Add to the list the high temperature alloys AM 350, AM 355, PH 15-7 Mo, 17-7 PH and 17-4 PH, A-286, Multimet Alloy N-155, and Inconel X. Titanium alloys, including 6A1-4V, 8Mn, and Ti-155A also have been processed.

One of the early concerns of engineers was that chemical milling might affect the mechanical properties of some or all of these materials.

North American Aviation Inc. concluded as the result of its own research that no significant effects of chemical milling showed up in these areas: 1. Tensile tests on AISI 4340. 2. Shearing strength tests on 17-7 PH. 3. Tensile, compressive, and shear tests on machine milled and chemically milled 6A1-4V titanium alloy sheets.

• Hydrogen embrittlement remains a major problem.

The chemical reaction that takes place between the work material and the acid etchants liberates free hydrogen that is picked up by the work surface. The addition of hydrogen makes the part more brittle, a serious detriment in critical applications.

The survey reports that an average hydrogen pickup of one part per million per 0.001 in. of metal removed has been found in titanium alloys. Both Thermold J and Vascojet 1000 steel alloys have picked up hydrogen during milling.

Several approaches to this problem are being explored. Some companies vacuum anneal titanium alloys after chemical milling to remove hydrogen. Use of an oxidizing acid to eliminate hydrogen pickup is being considered.

Because many of the parts suitable for the process have not been available in the high alloys, the chemical milling experience still is relatively limited. But with increasing reliance (particularly in the aircraft and missile industries) on metals that defy conventional cutting tools, chemical milling seems likely to become a major metal removal method.

Builder's Orders Up 77%

Incoming orders of Warner & Swasey Co., Cleveland, totaled $30.8 million in the first six months compared with $17.4 million in the corresponding period last year. Walter K. Bailey, president, says: "The rising demand for our products comes from a variety of industries and reflects a general industrial recovery. The volume of incoming orders indicates that the present operating rate should be continued during the balance of 1959." First half earnings skyrocketed from 51 cents last year to $2.15 a share this year.

Vacuum Packaging System Eliminates Rust Problem

Here's how to protect your coiled metal inventory from rust: Package it in polyethylene, toss in a drying agent, and then draw a vacuum.

In a high humidity exposure test, wire showed no corrosion after six weeks.

• **Method**—As the coils come from final inspection, they are set inside a polyethylene bag, two high on a pallet. The drying agent is inserted, and the air withdrawn by a vacuum pump.

Corrugated cardboard wrappers are placed around the bagged coils. Coils and cardboard are steel strapped to the pallet, ready for shipment and safe storage.

The method was introduced by National-Standard Co., Niles, Mich. Reelless coils of wire were used in the test.

Nitrate Salt Bath Additive Checks Effects of Chloride

If you use a nitrate salt bath to quench hardened steel, you'll want to know about an additive designed to prevent slow quenching action from chloride infiltration.

It's called Marquench Additive 356.

The maker (A. F. Holden Co., Detroit) claims that 4 lb per every 100 lb of salt bath under normal operating conditions will reduce the chloride content of the bath by 50 per cent. Correct melting point of the salt and quenching activity of the bath are maintained. Hard sludge is eliminated.

ON THE BALL

500,000 TIMES A DAY BRIDGEPORT Free-Machining Brass Rod!

Because ball point pens are in everyday use, production of vital brass tips becomes astronomical along with quality control problems.

These tips — one of which is shown much enlarged — are produced at ultra-high speeds. The brass rod needed for them must be flawless in every respect. *Consistent* metallurgical composition, *precise* dimensional tolerances and *unvarying* standards of machinability — if any of these qualities vary even a fraction, production comes to a frequent and costly halt.

That's why Revere Metal Art Co., Inc., New York City, specifies Bridgeport Free-Machining Ball Point Pen Brass Rod for these inserts. It meets all requirements for precision, straightness, workability, machinability and tolerances —and, in addition, provides a surface finish that keeps finishing time and costs to a minimum.

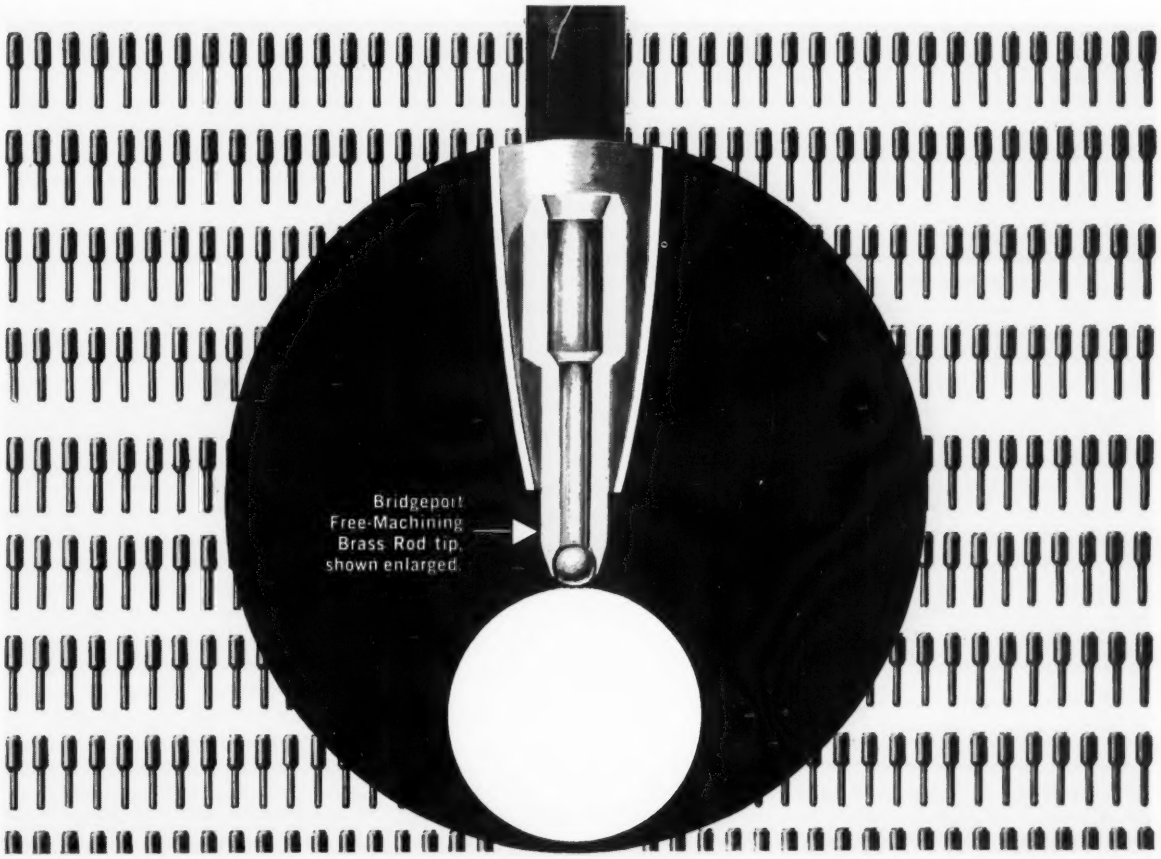
Whether you use rod, strip or tube, you can count—just as Revere does—on getting consistent quality every time you specify Bridgeport Brass Alloys. It will pay you to get the complete story. Call your nearest Bridgeport Sales Office or write us direct for a complete list of Bridgeport products—Dept. 3907.

BRASS Bridgeport CO.

BRIDGEPORT BRASS COMPANY

BRIDGEPORT 2, CONNECTICUT

Specialists in Metals from **A***luminum to* **Z***irconium*



The Next 10 Years: What We'll Buy To Keep up with Aircraft Design

- Metals that will take 400,000 psi plus.
- Ductile ceramics.
- Large amounts of the refractory metals.
- More built-up sheet structures to replace forgings, castings, extrusions.
- Newer, more expensive factories for high speed machining and fabrication.

MORE than ever we need the help of industry to solve the problems posed by space and ultrahigh speeds.

That's the inescapable impression you get from the forecast of trends and requirements for the next decade made by the Aerospace Industries Association of America Inc., Los Angeles. The predictions, just released, point up increasing demands for materials (especially refractory metals) which can withstand high temperatures and the need for unusual techniques for fabricating structures with them.

Here are some of the things the report says will be forthcoming in the next eight to ten years:

1. More metals with ultrahigh purity (experts suspect that impurities affect ductility and fatigue strength).
2. Ceramics that can be formed like metals.
3. Sheets made from extremely fine fibers with superstrengths.
4. Larger, more expensive, more complex machinery and factory installations.

• A cross section of the forecast points up the many challenges to metalworking. Industry must raise its sights two or three times higher than they are now.

The trend toward higher temperatures leads to metals of greater densities. Needed are alloys that don't go through a brittle range before reaching maximum service temperature. At the same time such metals must become easier to fabricate and be more ductile. Mills are advised to make structural shapes with tighter tolerances.

Sintering will help aluminum keep pace with trends since the technique increases temperature resistance. Landing gears and supporting structures will continue to require aluminum because temperatures are limited by rubber seals, tires, and gaskets.

The industry seems to stake high hopes on the refractory metals—tungsten, columbium, molybdenum, tantalum, and their alloys—to improve performance of aircraft. (Authorities have high hopes for a new alloy containing rhenium.) Greatest needs: Alloys of these metals with a brittle transition temperature under minus 65° F and usable high temperature strength.

Also, the prediction definitely feels that beryllium falls far short of meeting temperature resistance requirements of 1970. (Other characteristics like damping factor will bring increased usage.)

• Built-up structures will get increasing play.

Bars and plates, extrusions, forgings, and castings will grow less important by 1970 (forgings will take the biggest drop). But the use of sheets in structures will increase by a third (in terms of percentage of structural weight empty).

Castings are expected to decline in favor of weldments, the experts say. Relatively small precision forgings will be assembled to replace large complex ones.

Biggest strength increases will be chalked up in the low alloy and die steels—ultimate tensiles are expected to jump from around 270,000 psi to well over 410,000 psi. Low alloy steels follow closely behind by pushing today's 190,000 psi up to 315,000 psi. The forecast also indicates that the greatest increases will be in wrought rather than cast forms.

What about plating? Cadmium and zinc will almost disappear from the aeronautical scene (dropping from 65 per cent to less than 15 per cent of total requirements), while nickel and its alloys are expected to rise from 15 per cent to over 40 per cent. There is some increase in sight for chromium,

flame-sprayed oxides and carbides, and precious metals.

• Billions must be channeled into more manufacturing capability.

Time is growing short, say aircraft manufacturers, so they want series production to follow conception much more quickly. Metals will become more difficult to form, so extremely high or unusually low temperatures will be used during fabrication. Some metals will require chemical or electrical discharge machining.

All the predictions point to one thing: New facilities that will include more automation, numerical control, higher standards for quality control, and more expensive equipment.

Here is a lineup of the several needs as the aircraft people see it:

1. Assembly and joining. A trend toward welding and brazing will call for more combinations of processes—for example, welding and machining in a single positioner. Also needed are stable, stress-free subassemblies which have been welded, brazed, or heat treated.

Welding machines will be required for precise joining of sheets which taper from 0.005 in. to 0.5 in. Other equipment will have to travel from 2 to 300 ipm while welding molybdenum and titanium alloys.

Resistance welders still lack a method of monitoring to assure weld quality, the forecasters agree.

Other areas needing attention include fixtures for delicate parts, higher speeds and better alignment of thin sheets; more widespread use of ultrasonic welding; more atmospheric control possibly through Heliarc welding, pressure welding, or plasma jet; electron gun welding in a vacuum; localized heat treatment devices for use following welding.

Brazing requirements include better control of atmospheric contamination, better facilities for brazing new and bigger units, and closer control of variables.

What about the newer methods like adhesives? There will be much emphasis on ceramic adhesives many of which can now withstand 900° F. One authority told STEEL he expected performance "well over 1000° F within ten years."

Rivets and similar fasteners must withstand extremely low temperatures, corrosion, and hold 320,000 psi. Fabricators talk of a new way to upset rivets with ultrasonic energy.

The builders also want a method of joining metals without heat. Suggestion: A metallic compound placed in the joint and activated with a gas.

2. Shaping. Producers are going to have to get used to the idea of shaping metals more accurately. Assemblers can no longer use springback to force fit one piece into another—tomorrow's metals will be too strong and too stiff.

Parts will be shaped by: Precision casting; shear spin forming, hot and cold; explosive forming; extruding and forging to closer tolerances; deep drawing; vacuum forming of hot sheets (similar to vacuum forming of plastics).

U. S. Steel Corp.'s development of 120 in. sheets has also pinpointed the need for equipment which can handle such widths and reduce the number of joints in an assembly.

3. Machining. Look for much more emphasis on numerical controls, the experts tell us. It will be combined with all types of machines and processes—chemical, electrical discharge, ultrasonic, and subzero.

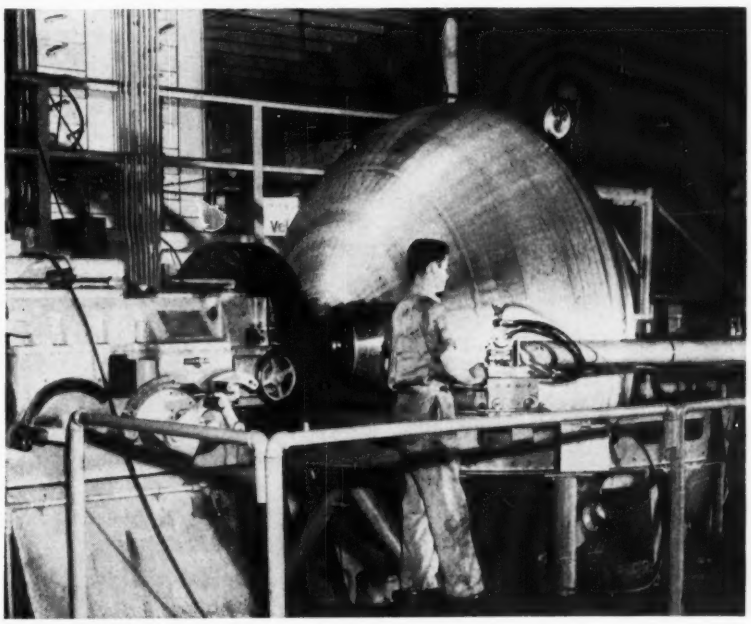
• Less manual control, larger furnaces, a greater vision with powder metallurgy are foreseen.

The report emphasizes a trend away from manual controls and points up the need for far greater sensitivity and automation in material removal equipment.

Plating, cladding, and heat treatment needs follow the trend toward higher operating temperatures. Vapor plating, alloy cladding, electrolytic and electroless plating methods are needed right away, say designers, to withstand 1200° F without deteriorating.

Heat treating of entire structures will be done more frequently at 2000° F, so lightweight fixtures must be developed for such heat. A new area: Furnaces large enough to cure the adhesive bonds in a whole airframe.

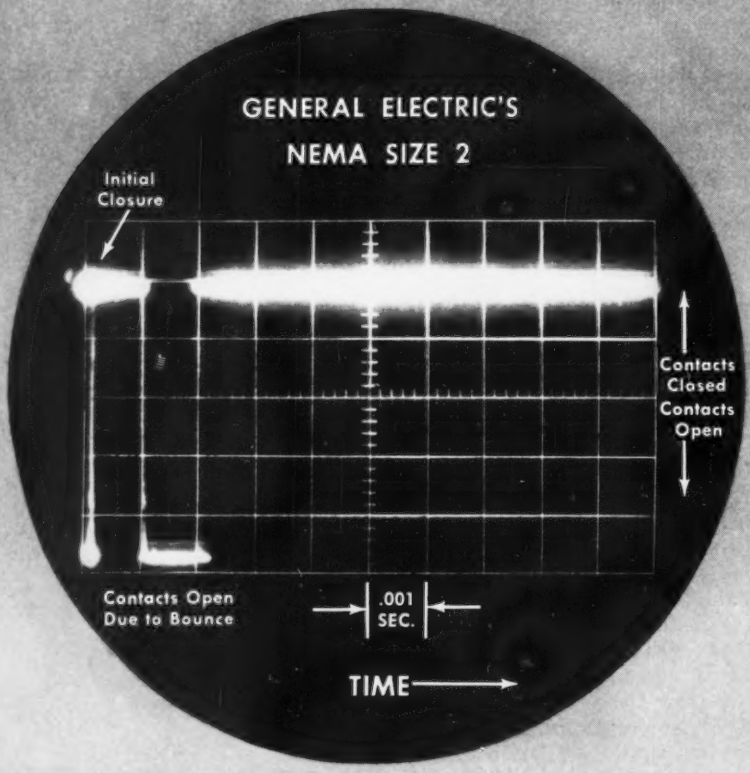
In powder metallurgy, designers are looking for these: Impregnation hardening of new materials; welding of fibrous materials; and fabrication of pressure vessels.

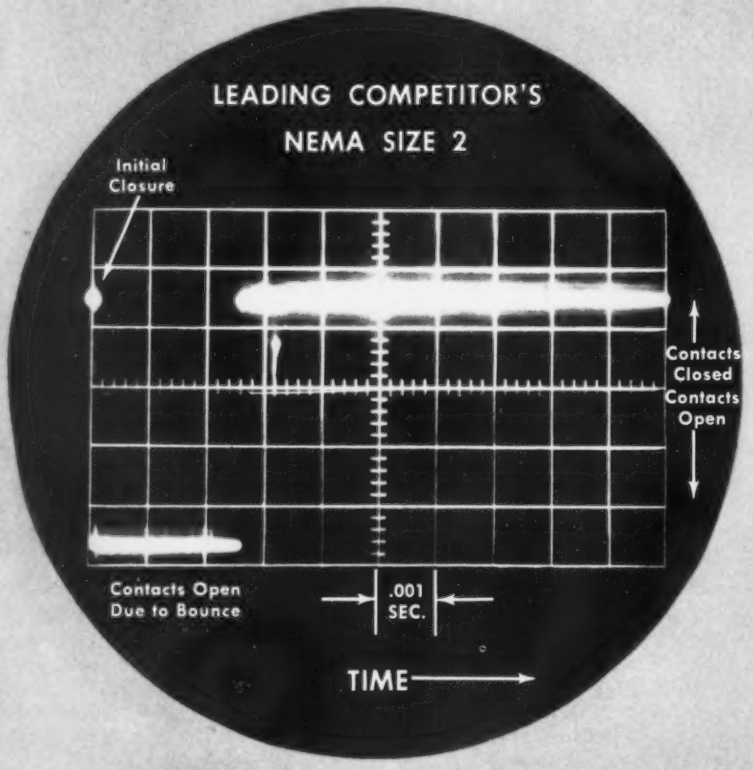


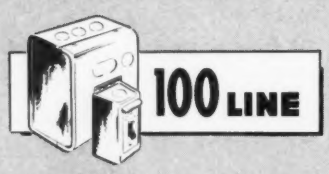
FUEL TANK HEAD ON LATHE was hydraulically spun from a 139 in. circular blank 7/16 in. thick by Missile-Air, a division of U. S. Chemical Milling Corp., Manhattan Beach, Calif. It's 105 in. in diameter and was fabricated from aluminum (alloy 5086) for a space project of the Army Ballistic Missile Agency, Huntsville, Ala. The lathe was built by Missile-Air to machine one side relative to the other for controlled wall thickness. Optimum strength and minimum weight were obtained by leaving heavy areas where welding was required during fabrication

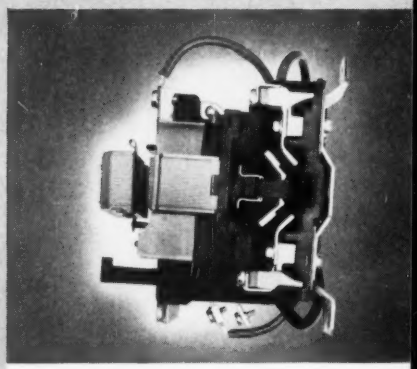
EXCLUSIVE CONTACT DESIGN OF GENERAL ELECTRIC'S 100-LINE

GENERAL ELECTRIC DESIGNS MAGNETIC STARTERS THAT REDUCE CONTACT BOUNCE (THE MAJOR CAUSE OF CONTACT FAILURE)—As shown by these unretouched photographs of cathode ray oscillograms, General Electric's wedge-action contacts achieve rapid, positive "make" with minimum bouncing or arcing. In 20 operations, General Electric's NEMA Size 2 starter (top) recorded an average bounce duration of only .002 seconds before final closure, with a maximum bounce duration of .007 seconds. A leading competitor's NEMA Size 2 starter (bottom) recorded an average bounce duration of .0035 seconds before final closure, with a maximum bounce duration of .0075 seconds. Conclusion: Shorter bounce duration of G-E starters reduces arcing and contact erosion to a minimum.









WEDGE-ACTION CONTACT design of 100-Line General Electric magnetic starters (see cutaway above) gives a virtually bounce-free, positive "make" every time.

MAGNETIC STARTERS (SIZES 0-1-2) MEANS . . .

BETTER PERFORMANCE

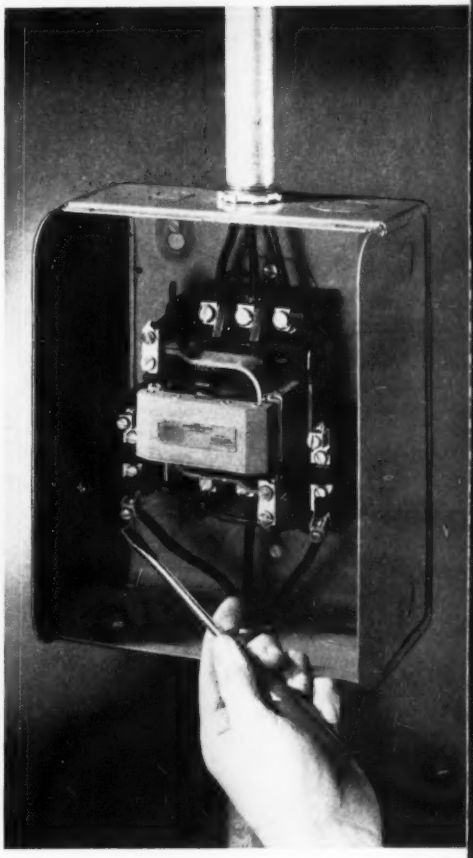
The wedge-action contact design of General Electric's 100-Line magnetic starters provides better performance by virtually eliminating contact bounce—the major cause of contact failure.

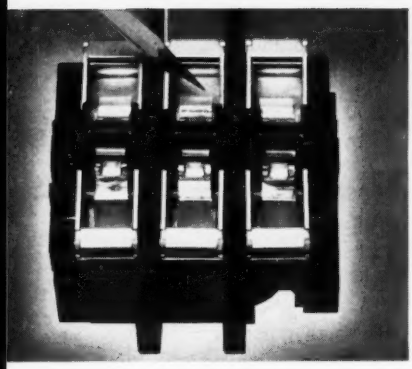
Less bounce and minimum arcing result from G.E.'s starter design because of less armature mass and spring-loaded contacts which absorb the shock of contact. Positive "make" is provided by G-E contacts because the contact arm design enables it to move only forward and back. Lateral contact movement is practically impossible, thus reducing arcing and contact wear, and assuring longer contact life. Positive "break" is provided by contact springs and a low-stress "kick-off" spring in the contact arm.

Also, less contact contamination occurs with G.E.'s 100-Line magnetic starters because vertical slant contact design shrugs off dust and dirt, keeps the starter performing better.

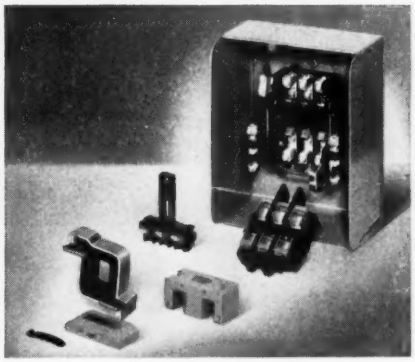
For information on all the other benefits of G.E.'s 100-Line design, contact your nearby G-E Apparatus Sales Office or Distributor, or write to Section 733-46, General Electric Co., Schenectady, N. Y. (Ask for Bulletin GEA-6917.)

GENERAL ELECTRIC



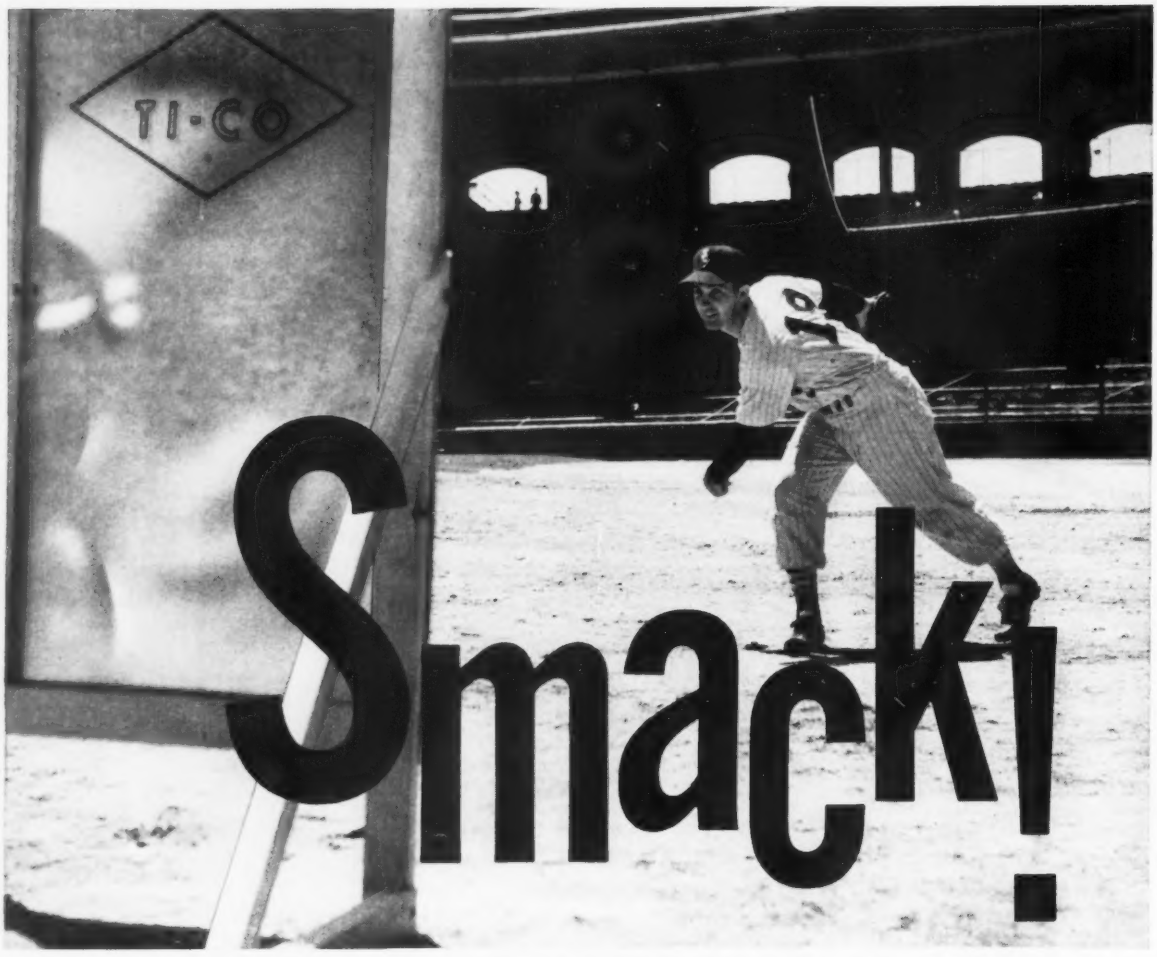


NEW ARC TRAP DESIGN on Size 2 starters releases ionized gases but contains arcs. Arcs are attracted to the magnetic steel *arc trap* which splits and cools them quickly.



SNAP-SLIDE CONSTRUCTION permits complete starter disassembly in 20 seconds, without tools. All operating parts either snap or slide together for maximum accessibility.

STRAIGHT-THROUGH WIRING with line terminals on top and load terminals on bottom saves wiring time. All wiring is done from the front, and no wires need be bent or looped.



PITCHER BILLY PIERCE FAILS TO FLAKE INLAND TI-CO®

We'd told Bill to go on out there and knock the spangle off that TI-CO galvanized sheet. But what we hadn't told him was that for years, manufacturers have been deep-drawing, spin-drawing, punching, perforating, crimping and Pittsburgh lock-seaming TI-CO with . . . never a flaking problem!

Sure, he dented it. In fact, TI-CO's easy formability is one of the nice characteristics of this versatile galvanized sheet. It's one of the many good reasons why manufacturers use TI-CO for so many new applications and products.

We think you, too, will like the fact that TI-CO galvanized sheet won't chip, peel, crack or flake no matter how tough the requirements. It is manufactured with dry, oiled or chemically treated surfaces to meet your production needs. It comes in sheets or coils in a wide variety of gages and widths. We'd like to tell you all about its specifications in our free TI-CO booklet which we'll be glad to send at your request. Meanwhile, for your galvanized sheet or coil requirements, it's a good idea to consult your Inland representative.

American League Pitcher Billy Pierce makes a close-up inspection—finds not a trace of flaking on TI-CO's zinc coating.

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Machine Surface Conditions, Marks Bars and Tubes

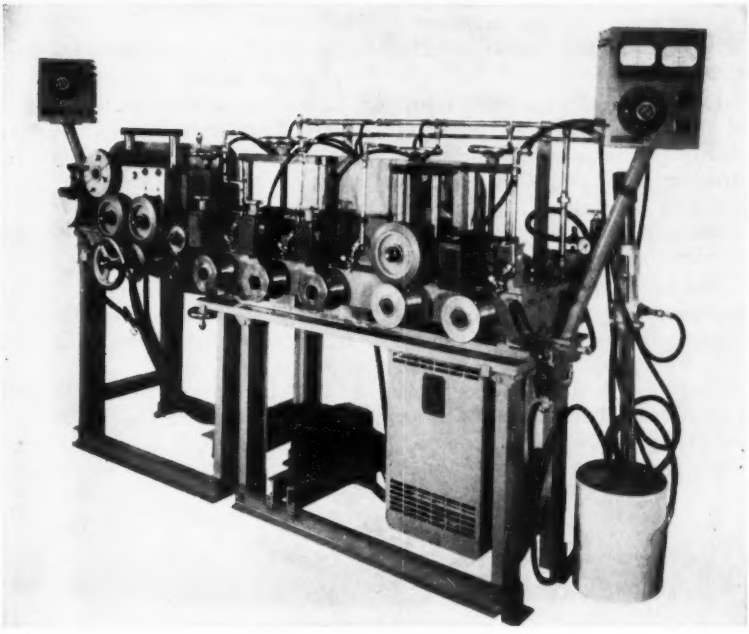
BETTER marking of moving bars and tubes is assured with a machine that surface conditions the stock before marking.

As the material to be marked enters the power driven guide rolls, a series of solvent bearing spray nozzles and adjustable squeegees remove any drawing compound or greasy materials from the surface of the bar or tube.

The machine will make printed (offset) or indented marks. The incisor portion of the unit, which is 180 degrees opposite the printed mark, can produce indented markings without a separate station.

The unit is adjustable for bar and tube sizes from ¼ to 6 in. and will mark from 125 to 1000 ft per minute.

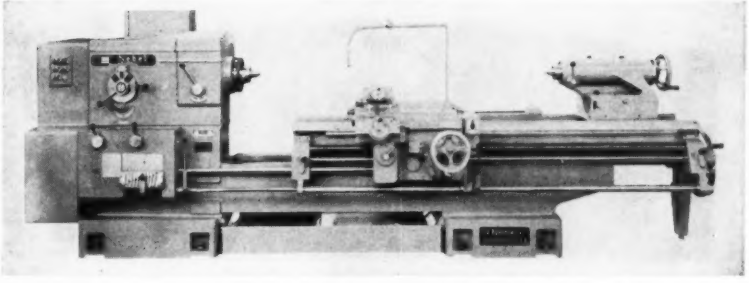
For more information, *write* Jas. H. Matthews & Co., 3962 Forbes Ave., Pittsburgh 13, Pa.



Extension Bed Gap Lathe Handles Heavy Work

PRECISION machining capabilities for turning and facing a variety of heavy duty work are built into the Nebel Model HXB 26/45 in. extension bed gap lathe.

The double purpose machine can operate as an engine lathe with 26½ in. swing over the bedways, or as a versatile gap lathe for large, odd-shaped parts, with 46 in. swing through the gap. A 75 per cent increase in distance between centers is available by opening the gap—48 in. with gap closed, 84 in. with gap open.



There are 18 gear driven speeds, the most ever offered by Nebel. They are selected from a direct reading color index, and controlled by two levers and color keyed speed plates. Speeds up to 1500 rpm are available. Only the gears required are engaged.

Up to 20 hp is supplied by a constant speed main drive motor through a multiple disc clutch and

brake mounted on the headstock.

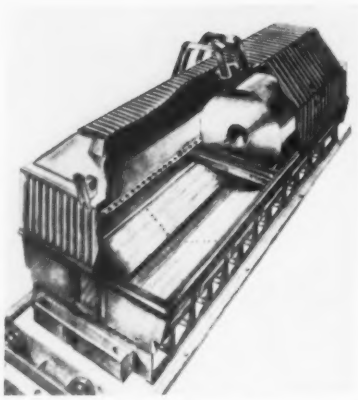
For more information, *write* Nebel Machine Tool Corp., 3401 Central Parkway, Cincinnati 25, Ohio.

Gondola Skid and Hood Cut Maintenance Cost

STEEL COILS in transit are well protected with this coil skid and gondola hood combination which is built of steel with replaceable oak facing.

Designed to allow a lower center of gravity, the coil cradle is deeply recessed. The all steel underconstruction of the skid is long wearing and cuts down on the expense of maintaining previously used heavy wooden timbers.

The hood, which is used in conjunction with the skid, keeps out dirt, weather, and prevents vandalism. The deep well skid permits shorter hood walls, allowing firms with lower ceiling clearances to use covered gondolas. The hoods are easily lifted with C-hooks, chains,



and slings, and are balanced and lighter for easier handling.

For more information, *write* Dept. DSH, Youngstown Steel Car Corp., Niles, Ohio.

NEMA Rerated Motors

A LINE of dripproof electric motors, ½ hp at 900 rpm to 150 hp at 3600 rpm, has been rerated in the new NEMA frame sizes 182 through 445 URS.

The frames are rigid, seasoned, cast iron with integrally cast feet. The cast iron end bells have precision machined registers and bearing fits. Deep-drawn baffle plates in the end bells provide extra protection for the winding.

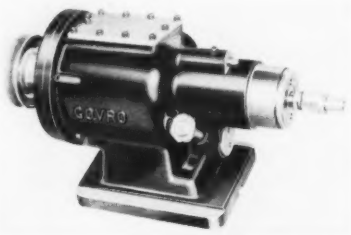
Diecast aluminum rotors are equipped with dual cooling fans and the entire rotor assembly is dynamically balanced. Stator windings are impregnated with moisture resisting, thermosetting, insulating varnish and are tested in accordance with NEMA specifications.

For more information, *write* Dept. 149, Lima Electric Motor Co. Inc., Lima, Ohio.

Automatic Drilling Unit

SHOP AIR is not required with the Model KHB drilling unit. It has its own built-in feed.

Also included is an infinitely variable control for hydraulic rate of feed with adjustable rapid approach to control the tool at entry and at breakthrough.



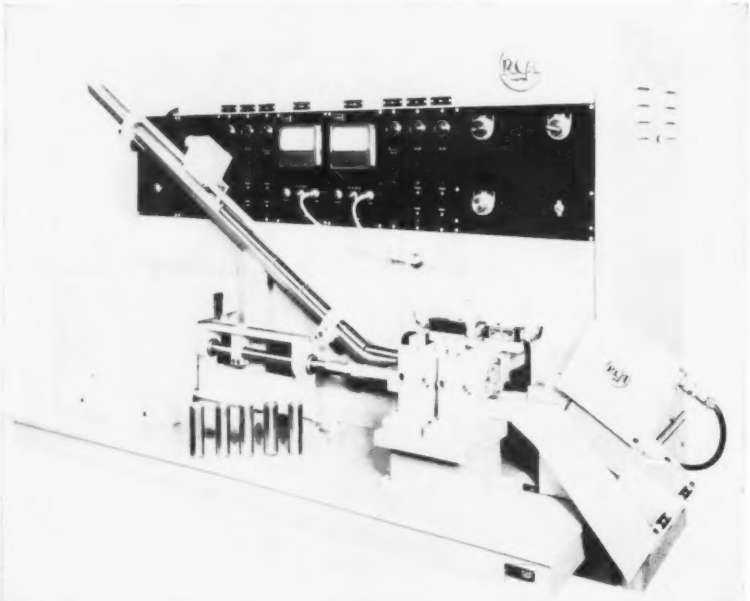
The unit will rotate and feed the tool into the work when the motor is turned on, and will withdraw when it is turned off. Accurate depth will be held as the unit will dwell against a positive stop at end of stroke.

For more information, *write* Govro-Nelson Co., 1931 Antoinette Ave., Detroit 8, Mich.

Hydraulic Press Line

IDEAL for forming, trimming, and force-fit assembly operations, the FD Series, high speed, hydraulic presses are available in bench models in 2, 3, 4, 5, and 6 ton capacities, and in floor models in 6, 8, 10, 12, and 15 ton capacities.

Dual hand and adjustable downstroke controls are standard on the presses. Electric pushbutton control with or without pressure reversal is optional. The return stroke is adjustable, permitting the shortening of the work cycle to where the



THIS HARDNESS MEASURING MACHINE processes piston pins at rates up to 2400 per hour, and sorts them into acceptable and reject categories. The pins are cross-fed into two standard hardness penetrators whose load can be changed for various scale ranges. The machine can be fed manually or receive parts directly from a processing machine. For more information, **write** Industrial & Automation Div., Radio Corp. of America, 12605 Arnold Ave., Detroit 39, Mich.

EVERY $6,400 YOU SAVE IN DEGREASING COSTS IS WORTH A $100,000 ORDER!

Columbia-Southern TRICHLOR helps you save money

Pretax earnings average 6.4% or $6,400 on each $100,000 of product you sell after raw materials, sales expenses, overhead, and miscellaneous are deducted.* Every time you save $6,400 in your degreasing costs, it is the equivalent of your net on a $100,000 order.

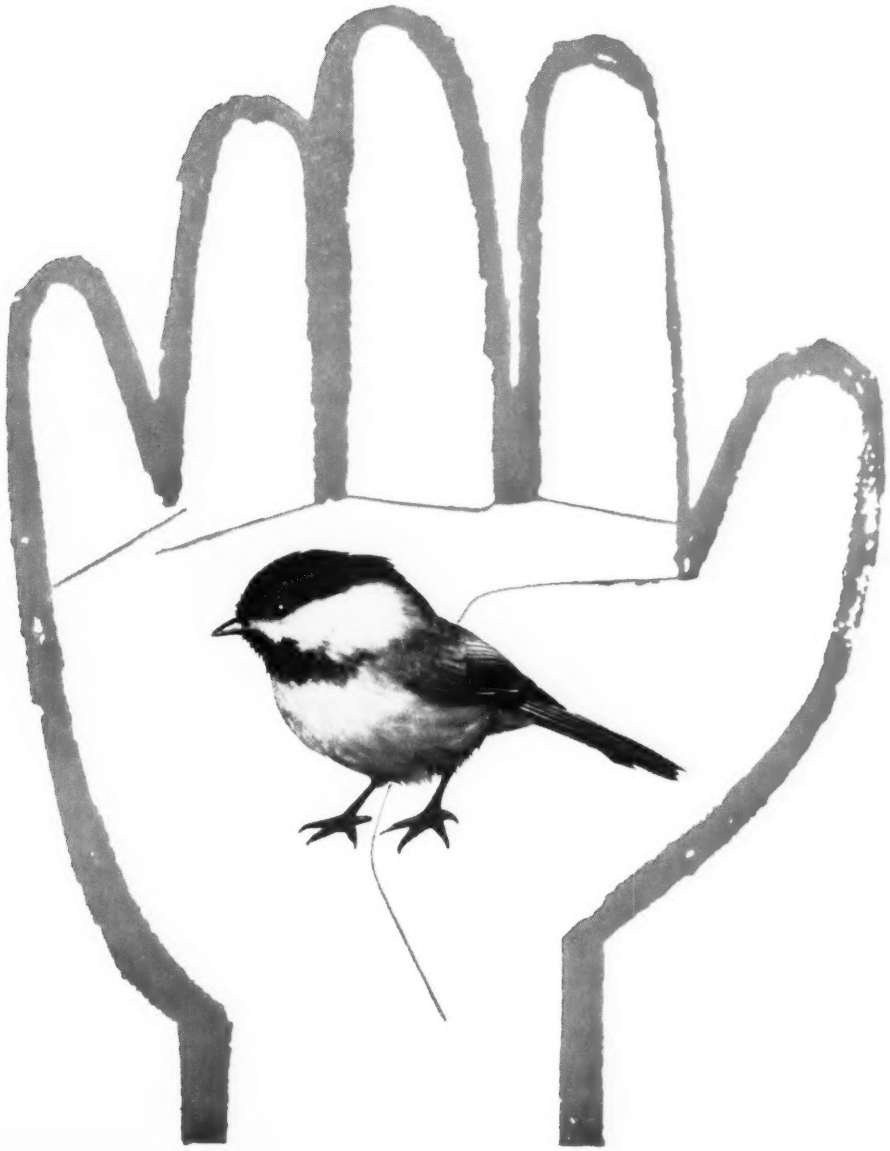
Columbia-Southern is a foremost name in degreasing knowledge and experience, product quality, cost-saving operation. Our Technical Service specialists will be glad to examine your degreasing process and recommend ways in which you can effect savings.

If a Columbia-Southern representative has not yet reviewed your degreasing operation, his visit will more than likely save you money. So, why wait? Write today to "Trichlor" at our Pittsburgh address.

*Based on Manufacturing Corporation Statistics for the first half of 1958.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

A Subsidiary of Pittsburgh Plate Glass Company • One Gateway Center, Pittsburgh 22, Pa.



PONTIAC fender, formed in a severe, one-hit drawing operation, is made of J&L drawing quality, cold rolled oiled sheet.

INTERNATIONAL HARVESTER utilizes the strength of J&L steel in rugged earth moving equipment manufactured by Construction Equipment Division.

E. F. HAUSERMAN COMPANY secures uniform flatness from coils of J&L sheet steel for its colorful, versatile movable wall partitions.

So easy to form, so flat,
so strong, so uniform...

no wonder so many
of America's leading
manufacturers use

J&L sheet steel

TAKE PLANNED ADVANTAGE of the many services available through J&L Warehouse Division's 13 strategically located Steel Service Centers.

Modern production methods and styling make increasing demands on sheet steel:

It shouldn't deviate in strength or finish—auto makers must double draw steel into sweeping curves and deep contours.

It shouldn't buckle—appliance, office equipment and furniture manufacturers want wide, strong planes that need no bracing.

It shouldn't wear, break or corrode—heavy equipment builders want tough steels that stand the bounce of heavy boulders and the grinding of abrasive gravel.

To provide the steels that meet these requirements, J&L invested nearly $800 million in new equipment and facilities.

These include a new 46-inch, high lift blooming mill—a new automatic oxygen scarfer—a new 80-inch four-high reversing rougher—a new horizontal scale breaker—a new cold reducing mill—a new cold shear line—new annealing furnaces—a new 56-inch temper mill—a new 44-inch hot strip mill.

The result? J&L sheet steels are remarkably ductile, strong, flat—sheet after sheet after sheet.

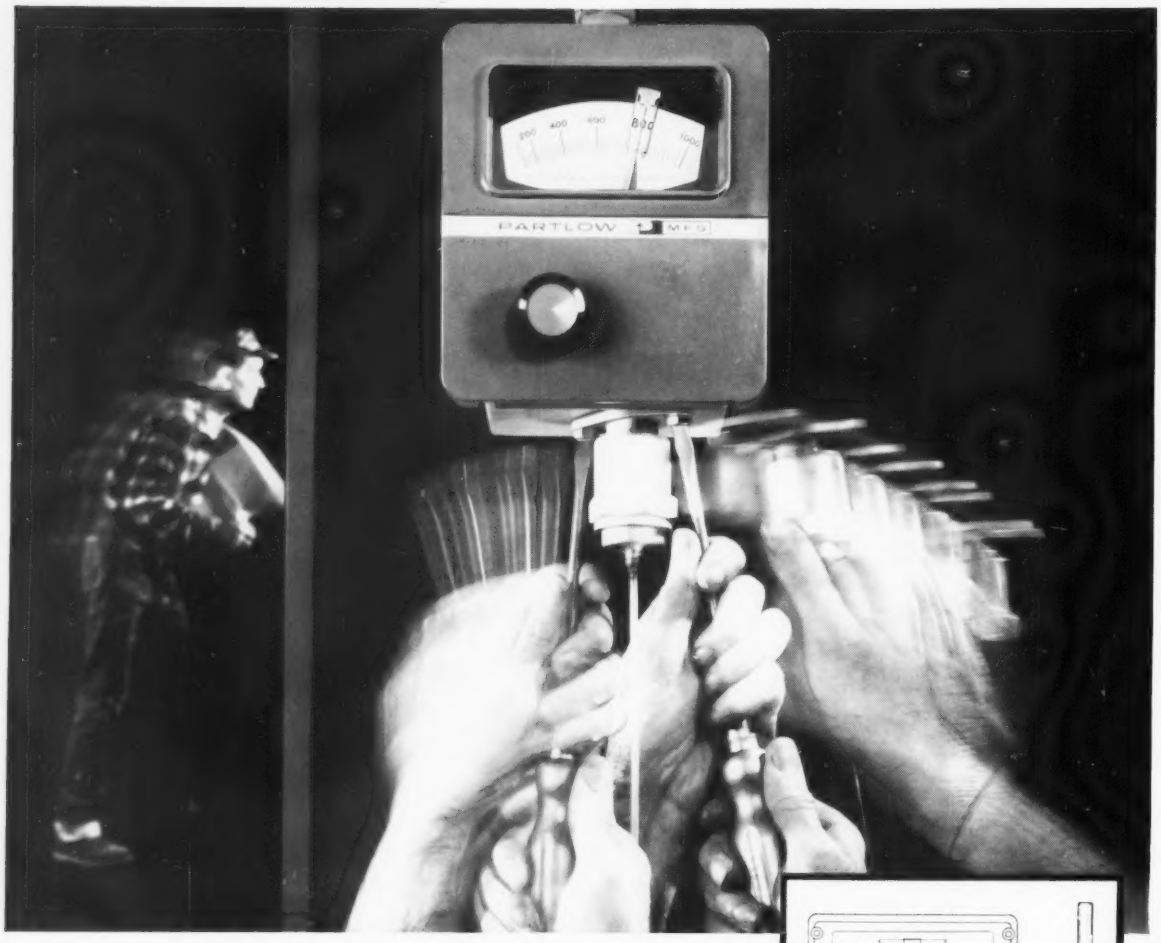
You can see why so many of the things you use and enjoy every day are made of J&L steel.

Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

RCA WHIRLPOOL is a major user of consistent quality J&L sheet steel in these 24" washers produced in modern Clyde, Ohio, plant.

NOW BEING INTRODUCED by J&L, these colorful, plastic-clad steel containers are made of J&L zinc-coated sheets for patio, utility room or yard.



The Temperature Control Designed for Fast

"DO IT YOURSELF" MAINTENANCE

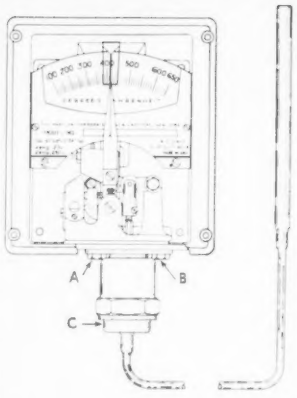
Right on the Job!

Rugged simplicity of design—along with the direct, positive power of mercury-actuation — combine to give Partlow maintenance and performance advantages no other type of temperature control can hope to equal.

Simplicity in the Partlow, for one thing, means that the control element can be changed *at the job site* in a matter of minutes with no other tool than a screwdriver . . . "Down time" is cut to an absolute minimum!

And simplicity in the Partlow also means the complete elimination of fussy electronic gadgets, delicate levers, hairsprings and other accessories that have a tendency to break down at the first trace of jar or jostle. Partlow controls are famous for their unfailingly accurate performance even under the most adverse operating conditions.

If you use or manufacture process equipment within the 30° to 1100° F. range, there's a Partlow pneumatic, electric or self-contained gas control (recording, indicating or non-indicating), to fit your application *precisely*. For details, write The Partlow Corp., New Hartford, New York. Dept. S-759.



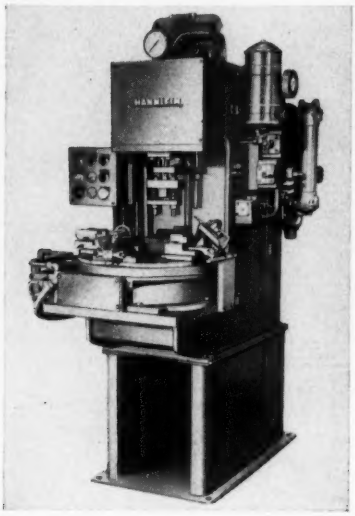
Diagrammatic view of the new MFS reveals "quick-change" feature common to all Partlow controls. In case of damage, merely unscrew at points (A) and (B), and remote element (C) from case. Reverse this process, and your Partlow is ready to resume operation.

You can pay more but you can't buy better than

PARTLOW

TEMPERATURE CONTROLS

Export Ad Auriema, Inc., 85 Broad St., New York 4, N. Y.



ram just clears the workpiece on repetitive operations. Tonnage is adjustable from 10 per cent of capacity to full rated capacity.

All models can be equipped with hydraulically controlled Hannifin index tables (see illustration) for high production, long run jobs. The index tables are for use up to 50 tons and have built-in hydraulic cycle timers.

For more information, *write* Dept. 124, Hannifin Co., Des Plaines, Ill.

Electric Furnace Has Functional Streamlining

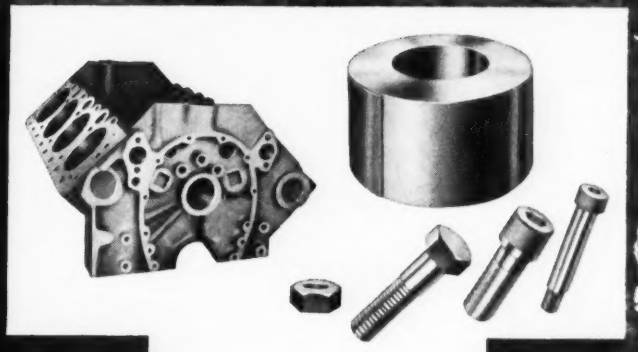
ROUNDED corners and few projections give the Waltz Model AR gastight, controlled atmosphere, electric furnace a modern look.

Doors are air operated by a foot valve, which makes it easy for the operator to open the door and stop it in any desired position.

Chrome-nickel (80-20) ribbon of large cross section forms the elements which are looped and slid into grooves in the refractory lining. The elements operate on 110 volts from 220 or 440 volt stepdown transformers in the base of the furnace.

Free-standing control panels are available in various combinations. The model illustrated has a Brown strip chart recording controller, a Brown Protecto-Vane with Chromel-Alumel thermocouples, and a time switch. The time switch and

VALVOLINE
Tectyl
protects metals against RUST



VALVOLINE'S amazing Tectyl rust preventives protect metal surfaces against *every kind of rust and corrosion* during storage and shipping.

Low-cost Tectyl compounds are easy to apply by brush, spray or dip and just as easy to remove. They protect metal surfaces against . . . sun and rain . . . heat and cold . . . salt air and salt water . . . humidity, perspiration and corrosive fumes.

Tectyl rust preventives meet exacting government specifications.

Write today for these two helpful Tectyl charts

1. "Valvoline Tectyl U. S. Government Approved Packaging and Preservative Chart." Gives the Army, Navy and Air Force "Specs" and applications.

2. "Valvoline Tectyl Industrial Rust Preventive Comparison Chart." Specifies applications covering the entire field.

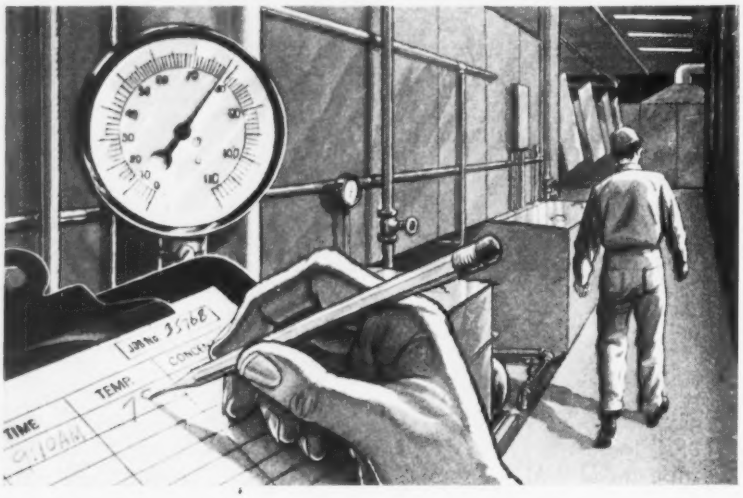
VALVOLINE Tectyl ALL-METAL PROTECTION RUST PREVENTIVES

VALVOLINE OIL COMPANY, Freedom, Pennsylvania
Division of Ashland Oil & Refining Company

To get the most economical spray washing

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



Oakite ROOM-TEMP cleaner cuts solution heating costs

That's right! Oakite Room-Temp cleaner gives good cleaning results at 70° to 100°F.—the temperature range you find in most industrial cleaning areas. This cleaning efficiency can save you money on steam normally required for heating of cleaning solutions.

Designed primarily for spray-wash machines, Room-Temp cleaner is non-foaming . . . good for steel, iron, brass, aluminum . . . has no odor . . . requires no ventilation.

Room-Temp cleaner provides top rust protection for in-process parts, too. It dries to a thin film that stops corrosion from attacking iron and steel for more than 300 hours at 90% humidity, 100°F.

ASK THE OAKITE MAN to tell you more . . . or to help you choose from the complete Oakite line a spray-washing material that offers most economy for the parts you're processing. Or, write for application data sheet B-6972. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE
50 1909-1959 SCIENCE
years' leadership in industrial cleaning

NEW PRODUCTS and equipment

calendar-clock mechanism turn the furnace on or off at any set time.

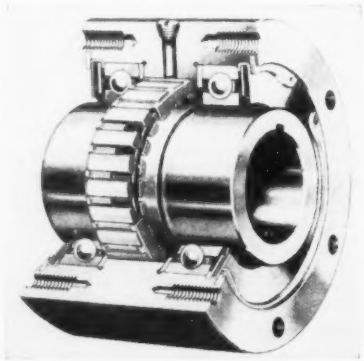
For more information, *write* Dept. 9, Waltz Furnace Co., 1901 Symmes St., Cincinnati 6, Ohio.

Overrunning and Indexing Clutches Are Improved

LONGER life and increased speeds are advantages of a new line of overrunning (HPO) clutches and high performance indexing (HPI) clutches.

The units have an improved sprag design and retainers that assure a co-ordinated movement of all sprags. The new design also insures positive engagement of every sprag, uniform distribution of driving load over all sprags, greater torque capacity for clutch size.

Running at identical speeds, an HPO clutch with Formchrome sprags gives up to 70 per cent longer life than a comparable standard Formsprag overrunning clutch. Formchrome sprags can be operated at up to 30 per cent higher rpm with the same life span as a comparable standard Formsprag overrunning clutch. Also the HPO clutch de-



LET'S TALK WIRE!

This spring is typical of hundreds of types and sizes of springs made from PAGE wire—and springs are just one of the many end products for which PAGE manufacturers wire is a logical choice.

Regardless of your use of wire, you can count on PAGE uniformity. Whether you make hairpins or lock washers, PAGE wire will give you the tensile strength, ductility, finish, tolerance and other properties you require.

PAGE facilities are designed to produce a wide range of high quality manufacturers wire items—including special shapes. Where requirements are exacting, you will find PAGE wire unexcelled.

Since 1902, we have pioneered many "firsts" in the wire industry. The latest of these is corrosion-resistant ACCO Aluminized Wire—commercially pure aluminum bonded to a steel core.

Why not put PAGE experience and knowledge to work for you to improve your product and lower your costs.

Let's get together and talk wire!

ACCO

PAGE MANUFACTURERS WIRE

Page Steel and Wire Division • American Chain & Cable Company, Inc.

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Bridgeport, Conn.

PAGE *-the source for answers to wire problems*

OVER 900

STEEL SERVICE CENTERS

throughout the United States

AWAIT YOUR CALL!

They maintain large, diversified stocks of cold finished steels to meet *all* of your requirements under 6000 pounds.

They have the facilities, experience and desire to serve you promptly and efficiently —as your requirements demand.

To be sure of uniform quality—from bar to bar, length to length—always specify Wyckoff Cold Finished Steels.

WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¾" and 14" x 1¾" • All types of Furnace Treated Steels including Carbon Corrected Steels

SPECIALISTS IN COLD FINISHED STEELS EXCLUSIVELY

WYCKOFF STEEL COMPANY

GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.
Branch Offices in Principal Cities
Works: Ambridge, Pa.,
Chicago, Ill., Newark, N. J., Putnam, Conn.

sign can be modified for special applications requiring high overrunning speeds up to 20,000 rpm.

A typical example of the HPI line: On 15 degree indexing, a Formsprag HPI clutch with a torque capacity of 475 lb-ft can be operated at 1200 indexes per minute without slip or backlash.

For more information, *write* Formsprag Co., 22601 Hoover Rd., Warren (Detroit), Mich.

Unit Determines Current For Cathodic Protection

CATHODIC protection current requirements to combat electrolytic corrosion in buried or submerged metal structures can be determined with the Harco portable test rectifier.

The unit provides adjustable direct current output on a timer-interrupted cycle or continuously to determine protective current requirements without the use of automotive batteries, bulky cabinet rectifiers, or similar sources of direct current power.

The complete unit consists of a transformer, selenium air cooled rectifier, automatic built-in current interrupter, direct current ammeter, and voltmeter. The device has a 1 rpm timer motor with cam adjustment for preselecting the desired operating cycle.

For more information, *write* Harco Corp., 4600 E. 71st St., Cleveland 25, Ohio.

Bench-Mounted Unit Tests In Tension, Compression

YOU CAN test specimens in tension or compression with the Model TE-10 bench-mounted tensile tester. It operates hydraulically and is designed for simple operation, high accuracy, and minimum bench space.

A 1/6 hp motor and a small hydraulic pump supply pressure to the hydraulic cylinder behind the load gage at the top of the tester. Loading is controlled by a manual valve. Capacity of the tester is 10,000 lb.

The unit is converted to compres-

Chemical energy provides direct current

Power is furnished by a fuel cell in the Allis-Chalmers Research Laboratories. It points the way to remarkably efficient means of energy conversion in the future.

Unlike the conventional storage battery, the fuel cell converts the chemical energy of gases (at room temperature) directly into direct current. For the future the fuel cell promises a highly efficient source of power.

Fundamental research of this type serves *two* end results at Allis-Chalmers: 1) enables design engineers to make equipment even better; 2) helps every industry achieve new efficiencies and economies.

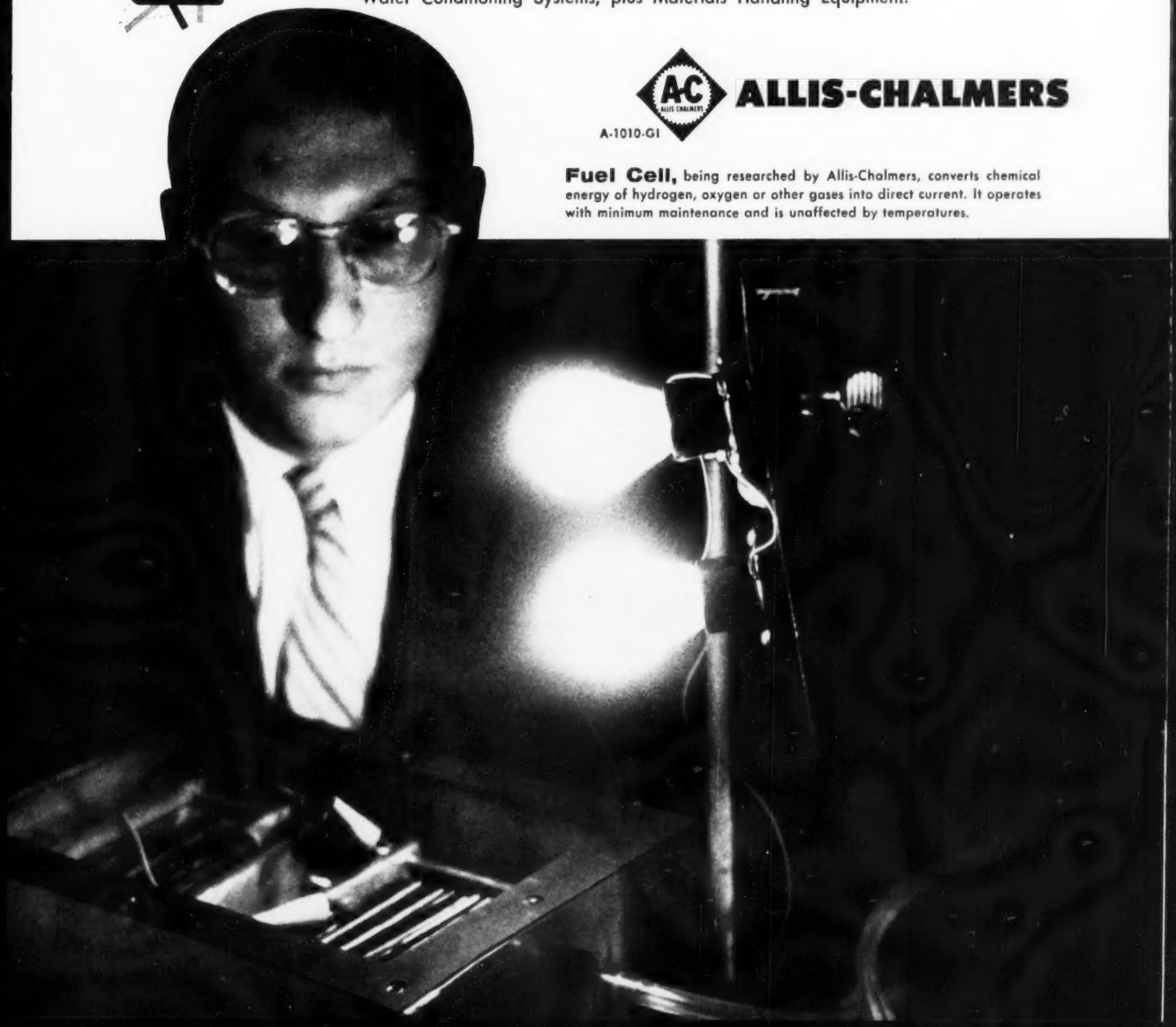
Research is only one area where A-C helps. Single-source availability of "teamed" equipment, maximum engineering assistance and outstanding service facilities are others. For more information, contact your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Plan to stay ahead... MODERNIZE!

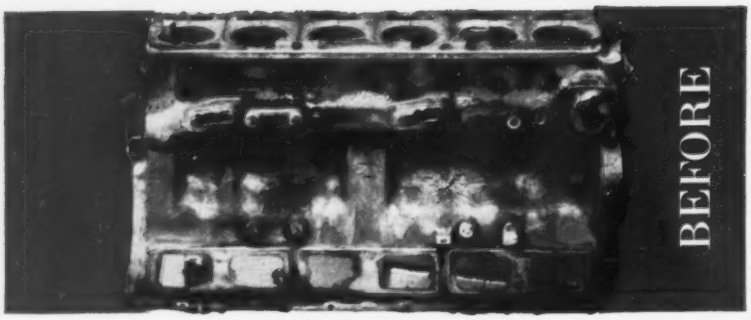
Products for Industry Electrical Generation, Distribution and Utilization Equipment; Pumps; Compressors; Mechanical Power Transmission Equipment; Processing Machinery; Motors and Control; Water Conditioning Systems, plus Materials Handling Equipment.

A-C ALLIS CHALMERS **ALLIS-CHALMERS**

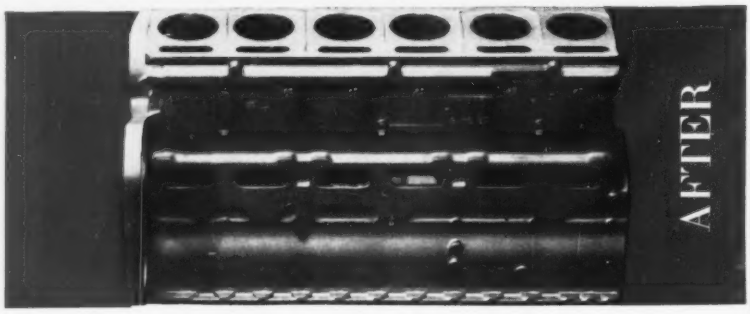
A-1010-GI



Fuel Cell, being researched by Allis-Chalmers, converts chemical energy of hydrogen, oxygen or other gases into direct current. It operates with minimum maintenance and is unaffected by temperatures.



GOLDEN FOUNDRY CO., INC. SAVES $5,000 ANNUALLY WITH WHEELABRATOR STEEL SHOT®



Wheelabrator Steel Shot saved Golden Foundry Co., Inc., Columbus, Indiana, $4,957.00 in their cleaning costs in one year.

How was it done? By changing from a malleable type abrasive to Wheelabrator Steel Shot.

Tests made over a period of a full year showed conclusively that Wheelabrator Steel Shot reduced abrasive consumption from 18 lbs. to 10 lbs. per wheel-hour over a malleable type abrasive. This 45% reduction in abrasive used brought actual savings of 28.4¢ per wheel-hour of operation.

More than 1,200 firms now have standardized on Wheelabrator Steel Shot, and are making similar impressive savings. Consistently harder, with greater resistance to breakdown, Wheelabrator Steel Shot lasts longer in use, cleans better, and reduces total cleaning costs. Your Wheelabrator Abrasive Engineer will help you achieve similar savings.

Send for complete information on how Wheelabrator Steel Shot can solve your cleaning problems.

ABRASIVE DIVISION

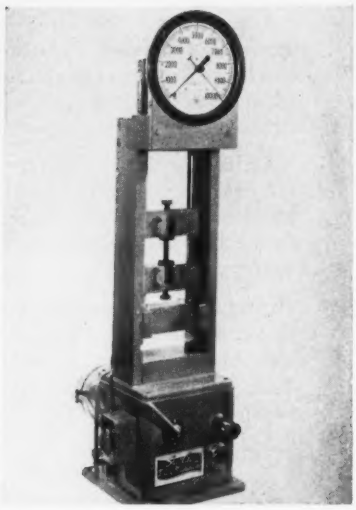
WHEELABRATOR
CORPORATION

509 South Byrkit Street **Mishawaka, Indiana**

Canadian Division: Box 490, Scarborough, Ontario

World's Largest Manufacturer of Quality Steel Abrasives

NEW PRODUCTS and equipment



sion tests by removing the jaw tightening screw from the upper jaw holder and inserting a pair of hardened compression plates in the space between the cylinder frame bottom and the upper jaw holder.

For more information, *write* Steel City Testing Machines Inc., 8817 Lyndon Ave., Detroit 38, Mich.

Rustproof Coolants Up Output More than 25%

PRODUCTION increases in cutting and grinding are possible with two new water soluble cooling compounds.

The cutting compound, called Saffire EP Soluble Oil, has in most cases upped production more than 75 per cent and, in some cases, doubled tool life. It has also been used in drilling Hipernick.

The Saffire grinding compound is transparent. It contains no wax. Case histories show production increases of more than 50 per cent in grinding 4130 steel, as well as other metals.

Both compounds are stainproof and rustproof, will not affect paint or harm skin, and are completely odor free. They may be diluted by water to requirements for many applications, eliminating the need for a variety of specialized compounds.

For more information, *write* Saffire Mfg. Co., 924 E. Main St., Alhambra, Calif.

"Research and development at National keep pace with expansion,"

reports Joe Marsalka, Metallurgist

"Expansion of plant and equipment are only part of the progress story at National Roll & Foundry Division. Our research and development program has made corresponding progress and, in addition, National and its roll customers benefit greatly through the research and development staff of the parent company, General Steel Castings.

"This expanded program has resulted in important developments which have increased the fine quality and dependability of National rolls. For example, in the steel foundry, a new quenching machine, developed by National, provides greater control in air or water quenching of alloy steel rolls.

"In the iron foundry, a new pressure ladle not only simplifies the production of nodular iron, but permits closer control of its physical properties.

"We are continually testing new ideas and new methods with one thought in mind . . . to give you the best in iron and steel rolls."

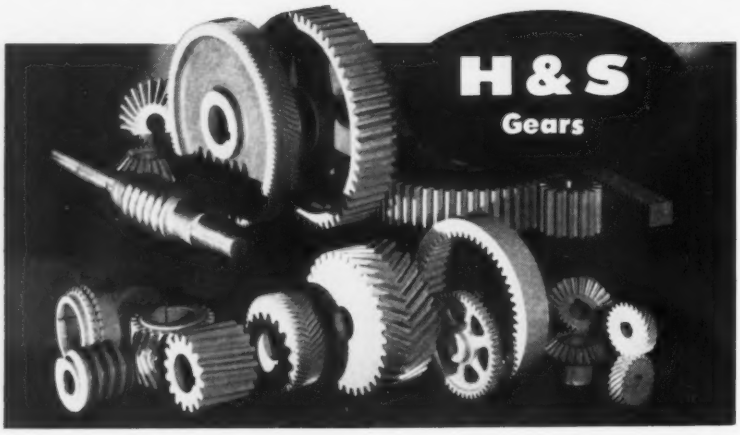
GENERAL STEEL CASTINGS

National Roll & Foundry Division

Avonmore (Westmoreland County) Pennsylvania

General Steel Castings Corporation: General Offices, Granite City, Ill.
Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.

Gears and Speed Reducers
for your power transmission needs



H & S offers a complete line of Speed Reducers. Single, double and triple reduction types using Herringbone and Helical gears provide ratios from 2.31 to 1 up to 429 to 1; Worm gear reducers' ratios range from 3.56 to 1 up to 10,000 to 1. H & S has also become a leader in engineering and building special drives with space- and cost-saving features.

Industrial Gears, large or small, backed by over 70 years experience: Spur Gears up to 160″ dia.; Spur Racks up to 12 ft. long; Helical Gears up to 125″ dia.; Sykes Herringbone, up to 60″; Straight Bevel, up to 77″; Worm Gears up to 60″ dia.; Sprockets, up to 48″ dia. H & S Gears are available in Steel, Cast Iron, Ductile Iron, Bronze, Rawhide, Fibroil, or Bakelite.

Send for Speed Reducer Catalog No. 55, Gear Catalog No. 57.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue • Cleveland 14, Ohio

NEW literature

Write directly to the company for a copy

Photoelectric Control Catalog

Bulletin GEA-6822, describes GE's full line of controls for industrial counting, sorting, signaling, protecting, diverting, detecting, or limiting jobs. General Electric Co., Schenectady 5, N. Y.

Tap and Gage Selector

This chart lists the DoAll tap, tap drill, and plug and ring gages needed to produce and check classes of threads. DoAll Co., Des Plaines, Ill.

A-286 Small Tubing

Small tubing made from A-286, an alloy developed for high temperature applications, is described in a special analysis memo, No. 114. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Concrete Floors

A 24 page booklet, MP-4d, discusses the major features sought in the design of any industrial floor subject to heavy use. Master Builders Co., Cleveland 3, Ohio.

Low Cost Tooling Ideas

A 66 page book contains case histories on use of Delta Tools in combination with other tools, with automatic controls, and in special setups to automate operations, increase production, and perform operations normally done on expensive, special purpose machines. Rockwell Mfg. Co., 4 N. Lexington Ave., Pittsburgh 8, Pa.

Liquid Plastics

Liquid polyvinyl plastics that set with heat are described in a 16 page booklet. Logo Div., Bee Chemical Co., 12933 S. Stony Island Ave., Chicago 33, Ill.

Battery Maintenance Manual

"What to Do When the Battery Comes," is a 20 page bulletin on motive-power battery installation and maintenance. Exide Industrial Div., Electric Storage Battery Co., Rising Sun & Adams Avenues, Philadelphia 20, Pa.

Magnetic Recording Tape

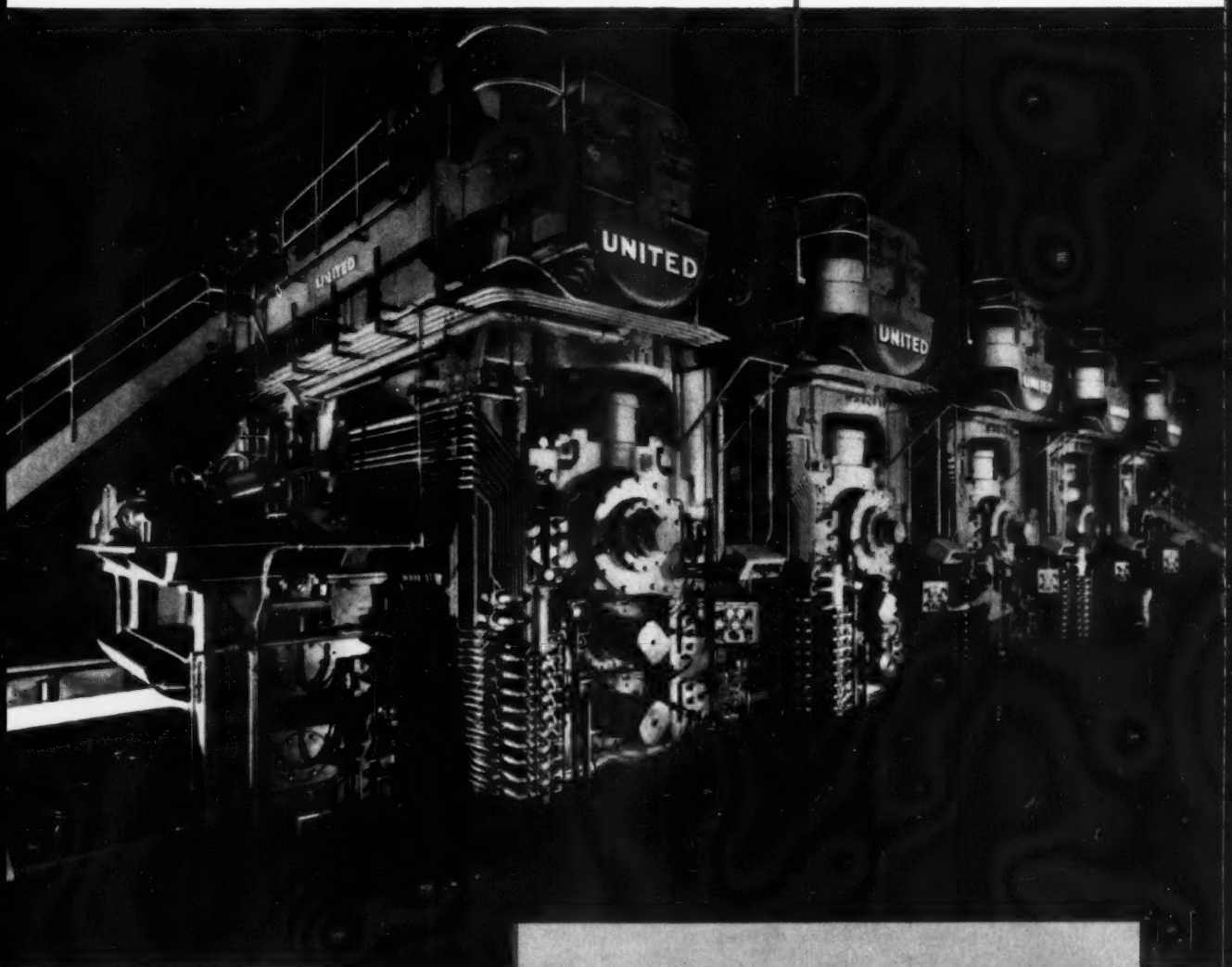
This study shows that the reliability of magnetic recording tape used for instrumentation purposes is significantly affected by the characteristics of the base material. Film Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.

Refractory Cements

Description and data on the expanded line of products for industrial furnaces appear in a 16 page booklet entitled, "Cements, Mortars, Coatings—Coordinated to the Furnaces of Industry." Mexico Refractories Co., a division of Kaiser Aluminum & Chemical Corp., Mexico, Mo.

UNITED®

100" 5 Stand Continuous Hot Aluminum Finishing Train

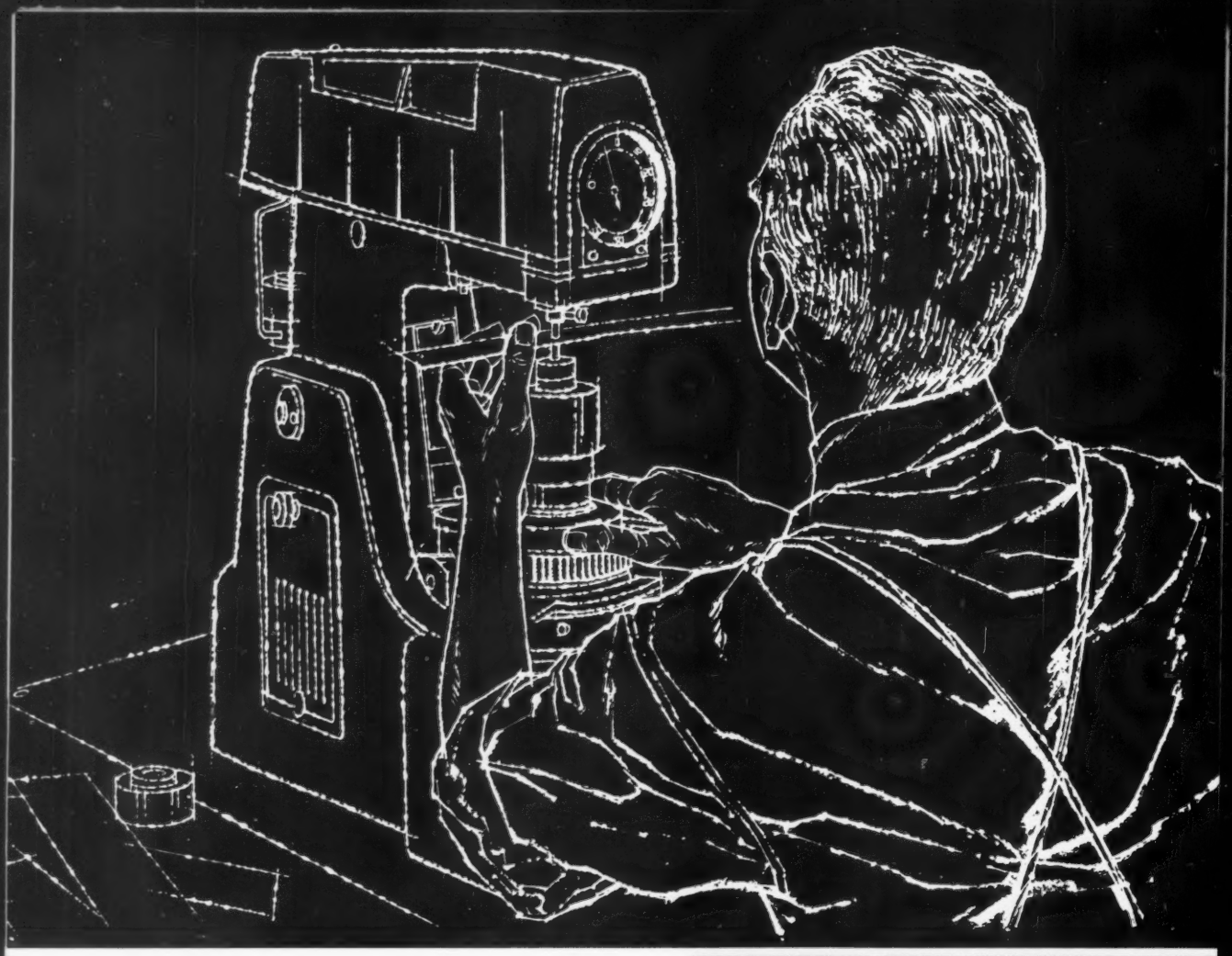


UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



PRECISE HARDNESS CONTROL

to your specifications with

J&L Cold Rolled Strip Steels

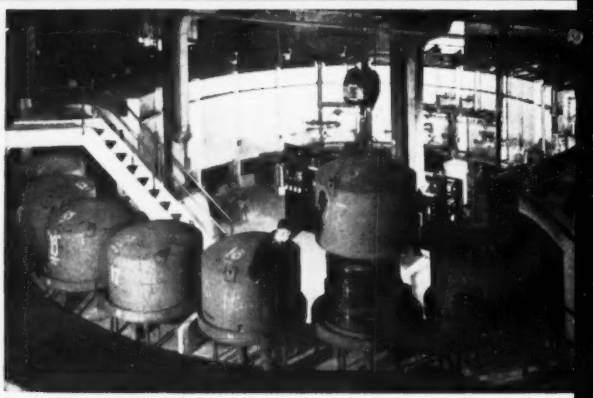
Variations within standard commercial limits of hardness for strip steels may not provide the quality needed for most critical applications.

At J&L the newest equipment and techniques are used to provide controlled hardness—to your specifications.

Basic oxygen converters, high standard open hearth practice and electric furnaces provide optimum melting conditions, new hot strip mills are specifically designed to produce the finishing temperatures needed for inherent quality. Cold mills, annealing and normalizing furnaces and other equipment are designed specifically for precision strip steel processing.

With an organization experienced in specialized strip steel processing, your most rigid specifications can be met consistently.

For your convenience, precision strip facilities are available to you in our plants at Youngstown, Indianapolis, Los Angeles and Kenilworth (N. J.)



The small unit rotary annealing method assures precision temperature control and develops optimum hardness and microstructure for high carbon, low carbon and alloy strip.

J&L STRIP

LOW CARBON • HIGH CARBON • ALLOY • STAINLESS
TEMPERED SPRING STEEL • ZINC AND COPPER COATED

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, Ohio

July 27, 1959

Steelmakers Booking Fourth Quarter Orders

STEELMAKING operations, under the impact of the first industry-wide strike since 1956, dropped to 13.5 per cent of ingot capacity last week, off 25.2 points from the preceding week's revised rate of 38.7 per cent. Output was estimated at 382,000 net tons vs. 1,097,000 the week before (when the strike broke out), and the record 2,657,000 reported in the week ended Apr. 19.

In the 1956 strike, the ingot rate fell to 12.5 per cent. At that time weekly capacity was rated at 2,461,758 net tons compared with 2,831,331 now.

MAY DROP FARTHER—With labor contracts of more mills scheduled to expire over the next several weeks, a further decline in the ingot rate is in the cards, barring an unexpected early strike settlement, or temporary extension of existing agreements.

Fifty-six producers with annual primary steelmaking capacity of 21,929,790 net tons, equal to 419,000 tons weekly or 14.8 per cent of national capacity, were unaffected by the July 15 walkout. Some held unexpired contracts; others were able to get temporary extensions from the union. Including captive capacity, something like 200,000 tons weekly of pig iron producing capacity continues active.

BUYING HOLDS UP—Demand is better than had been expected in light of the strike shutdowns, and the comfortable inventories of most consumers. Some users who had canceled orders when rumors were afloat the strike would be averted, are now seeking reinstatement of their contracts. Tonnages involved are small, but the switch in consumer policy is significant.

It stems from the growing belief the strike will not be quickly settled. Inventories, estimated around 21 million tons, may get pretty thin before production is resumed. At least, they are likely to become critically unbalanced.

MILLS TAKING ORDERS—Third quarter order books of most producers are closed, though some could handle additional tonnage for the period if the strike ended quickly. For that matter, some wire business could still be worked into August schedules. However, with a long shutdown in prospect, that's largely academic.

Actually, most mills figure that July 15 was the deadline for September tonnage on the basis of normal leadtime of 45 days. August and September bookings were substantial when the walkout occurred, and these, with carryover tonnage will keep the mills occupied after the strike.

FORWARD BOOKINGS—In the case of business for delivery beyond September, the mills are accepting orders subject to delays occasioned by the strike. Few contracts are being entered for a specified delivery date, and even those are subject to the mills' ability to handle them. No new customers are being taken on.

With respect to government rated orders, which have created no particular problem up to this time, some strikebound mills are returning them to government contractors, suggesting they be placed with mills that are still operating.

PRODUCT POSITION—Cold rolled and galvanized sheets are under greatest pressure. The mills were behind on deliveries of these products when they were struck.

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*Current prices were published in the July 20 issue and will appear in subsequent issues.

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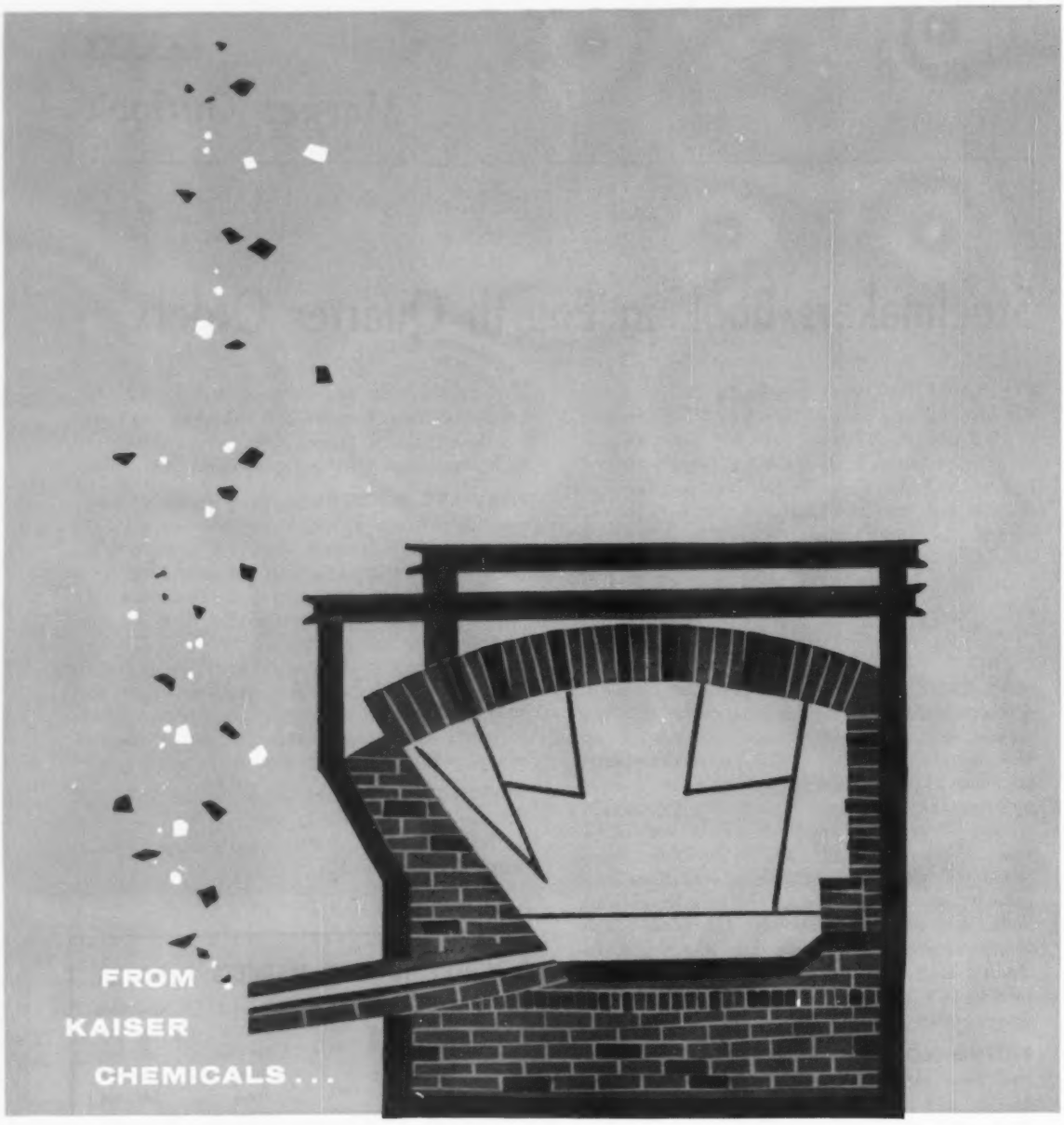

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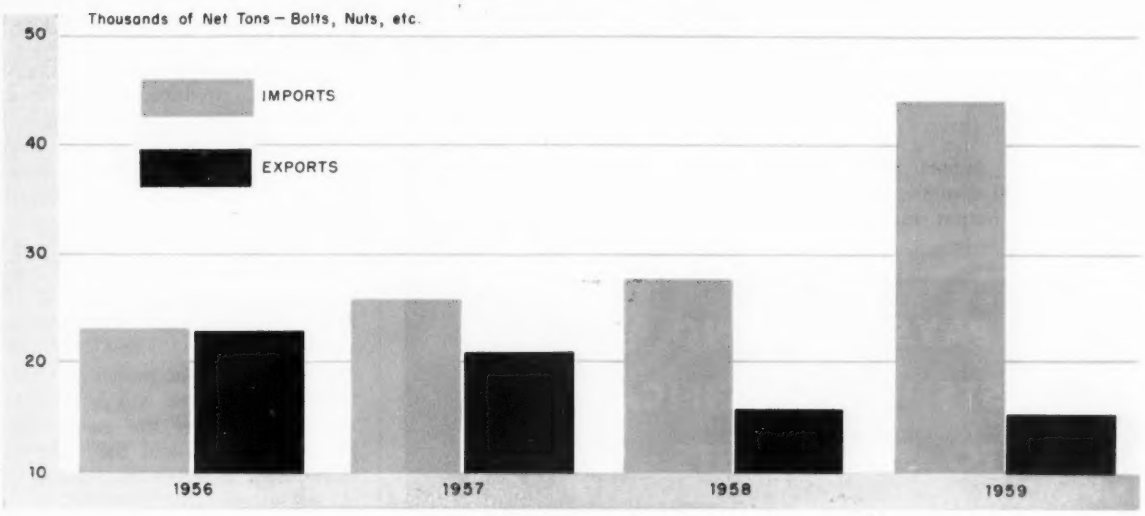
Fastener Imports Climb, Exports Dip



INDUSTRIAL fastener production this year is up a healthy 43 per cent. If that pace is sustained, old records certainly will be shattered in 1959, though imports present a growing threat to market stability.

Virtually all users are taking larger tonnages. Buying on the part of the automotive industry, which accounts for 20 to 25 per cent of consumption, is active. Aircraft needs, especially for repairs, are booming. The construction industry's requirements are heavier. So are those of the railroad and appliance industries, and a myriad of smaller consuming lines. Usually, miscellaneous manufacturing takes 50 per cent of output.

• Distributors, through whom an estimated 25 per cent of the industry's production is marketed, have been building their inventories steadily.

Also, makers have been enlarging their own stocks of fasteners to meet anticipated heavy demands the remainder of the year. At the same time, they have been building their supplies of steel against possible strike-induced shortages this summer.

The industry's steel intake is running at an indicated annual rate of 1,613,000 net tons, 83 per cent more than in 1958. If attained, a new high will be set (see table). Over the years, the fastener makers have taken 1.5 to 2 per cent of total steel shipments. In the first five months of this year, their take was at a rate of 1.7 per cent, highest since 1956.

Despite larger fastener output, the industry's income has not risen in proportion to its production gains. Reason: Severe price competition, a hardy perennial that persists despite efforts to achieve stability. "Price fighting," heretofore attributed to overcapacity, shrinking markets for some types of fasteners, and rising competition from other methods of joining, is intensified by growing imports.

Steel Intake by Fastener Manufacturers

(Thousands of Net Tons)

YEAR	TOTAL	MONTHLY AVERAGE
*1959	1,613	126
1958	879	73
1957	1,149	96
1956	1,485	124
1955	1,475	123
1954	965	80
1953	1,342	112
1952	1,298	108
1951	1,599	133
1950	1,410	118

*Estimated. Based on shipments in first five months.

• Imports account for only about 4 per cent of the over-all market, but they run much heavier in some items (up to 30 per cent in wood screws, for example).

And the over-all volume is rising alarmingly, not only in coastwise markets, but in the Midwest as well, now that the St. Lawrence Seaway gives easy access to that huge consuming area.

Official statistics show imports are running at an indicated annual rate of 43,835 net tons. That's 57 per cent greater than in 1958, and 87 per cent above the 1956 total (see chart). And the figures tell only half the story. They do not include the incalculable tonnage of fasteners imported as parts of assemblies and subassemblies flowing into this country in a steadily rising stream.

For example, more than 500,000 automobiles will be imported this year, but the fasteners used in them will not be mirrored in the import statistics.

Exports do not offset imports. In

fact, they are shrinking (see chart). So far this year, at an indicated annual rate of 15,287 net tons, they are down about 1 per cent from the 1958 total, and are off 33 per cent from 1956 volume.

Still just as disturbing, while most of the exports are of special type fasteners, the bulk of imports is of standard items.

• Unless the import problem is licked, the 400 domestic producers, with annual output exceeding $1 billion at the manufacturers' level, may be in for a bad time.

Recognizing this, trade leaders are urging that the present low tariff be raised sharply to offset the wage advantage of European and Japanese producers. American workers are paid four to six times more than their foreign counterparts.

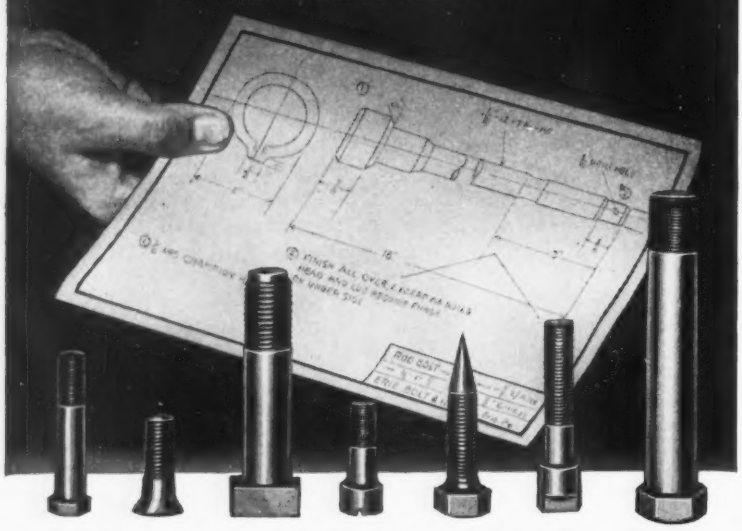
Production efficiency and improved technology, it's said, alone are not enough to wipe out the cost disparity to the extent domestic manufacturers can meet import prices, which, at times, run 30 per cent under domestic levels.

• Fastener makers are seeking to stabilize their markets through refinements and simplification of pricing methods.

Last spring, Screw & Bolt Corp. of America introduced net delivered pricing on most of its output, replacing the complicated list and discount system long in vogue. Last month, Russell, Burdsall & Ward Bolt & Nut Co. issued new list prices and discounts simplifying its pricing by establishing several lists covering various products, instead of having all products based on a single list.

It's thought that most other fastener manufacturers will delay price action until after the steel wage issue is resolved, and the trend of steel prices definitely established.

IT PAYS TO SEND YOUR FASTENER SPECIFICATIONS TO SPECIALISTS . . .



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Enters Fastener Field

Threaded Products Inc., 6452 Penn Ave., Pittsburgh, Pa., has been organized to make screws, nuts, bolts, and other types of threaded fasteners.

Steel Bars . . .

Bar Prices, Page 155

Inquiry for commercial steel bars is holding up much better than most producers had expected. Consumers didn't get all of the tonnage promised them before the strike shut off shipments despite the strike deadline extension to July 15. They not only would like to have the tonnage owed them on contracts, but, in many cases, indicate they will order additional tonnage, if that's possible.

Lack of progress in negotiations indicates the strike will be prolonged. Meanwhile, the mills are continuing to book business for delivery later this year, bookings being accepted with the proviso that deliveries are subject to delays occasioned by the strike. Some mills are taking no more third quarter orders, figuring that July 15 was the deadline for September deliveries on the basis of normal lead-time of 45 days.

Sellers generally are acknowledging receipt of new orders, advising customers that after steelmaking operations are resumed, orders will be

scheduled in the order of their receipt, with shipments dependent upon the time required to take care of the carryover.

All bar capacity has not been made idle by the strike. The labor agreements of some producers of cold drawn bars extended beyond the July 15 strike deadline.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 156

Most reinforcing steel bar contractors have six to eight weeks' supply of steel on hand. As a result, they hope to weather the steel strike without too much difficulty.

A substantial proportion of reinforcing steel producing capacity was not immediately affected by the strike. Many of the smaller mills specializing in concrete bars have contracts that do not expire for some time. Others were able to win contract extensions pending settlement of the labor issue by the larger producers.

In any case, most buyers will be able to get along pretty well over the next few weeks, in light of current production and stock accumulations in warehouses and by consumers themselves. Building projects will probably not be affected to any marked extent unless the strike is prolonged.

Competition for California highway and public works projects is reported getting keener. Latest figures show an average of 8.7 bidders per project, against 6.3 bidders per project in the last three months of 1958.

Reinforcing bars for California public works and highways cost the state an average of $10.80 per 100 lb in the first quarter vs. $12.20 in the closing quarter of last year. The bid price continued to decline despite rising steel costs and appeared to reflect higher productivity in construction and increased bidder competition.

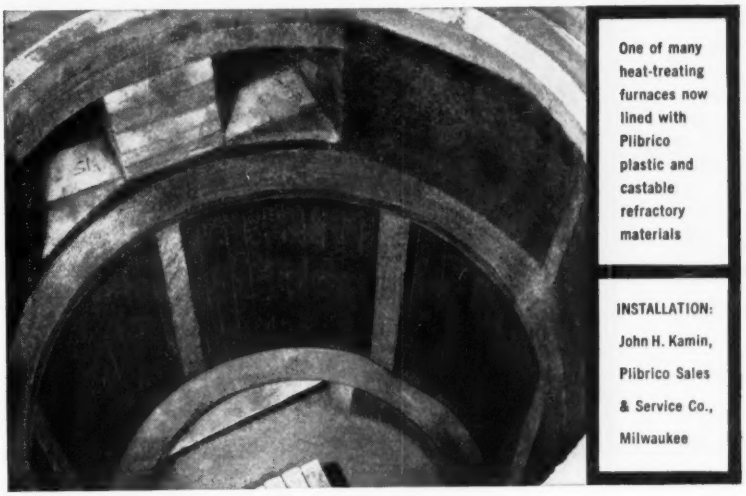
Bar fabricators hold a substantial volume of business, much of it in public work. However, recently there have been signs that public jobs may be held up for lack of funds. In Illinois, for example, a freeze has been placed on $80 million in new public construction until Jan. 1. This was done because of an unbalanced budget. Highway construction is not involved.

Phoenix Steel's Proposed Plant Financing Studied

Phoenix Steel Corp. has received definite offers for the construction and financing of its proposed new steelmaking plant on the Delaware River at Burlington, N. J. Officials of the company say, however, "negotiations presently are aimed at clarification of the terms and the conditions of these offers."

Orders Coil Welding Line

U. S. Steel Corp., Pittsburgh, will construct a coil welding line at the No. 18 hot strip mill in the McDonald, Ohio, plant of its Youngstown District Works. Coils weighing up to 30,000 lb will be produced. Present limit is 8500 lb. E. W. Bliss Co., Canton, Ohio, will be the principal contractor; McKay Machine Co., Youngstown, will supply several major pieces of equipment; and U. S. Steel's Ameri-



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	Former replacement lining	Plibrico's replacement lining
"Down time" during replacement	30 days	3 days
Installation cost	$1200	$650
Service life	1 year	2½ years

In brief: a $550 saving on installation . . . "down time" slashed tenfold . . . service life 2½ times as long.

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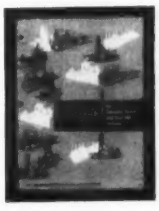

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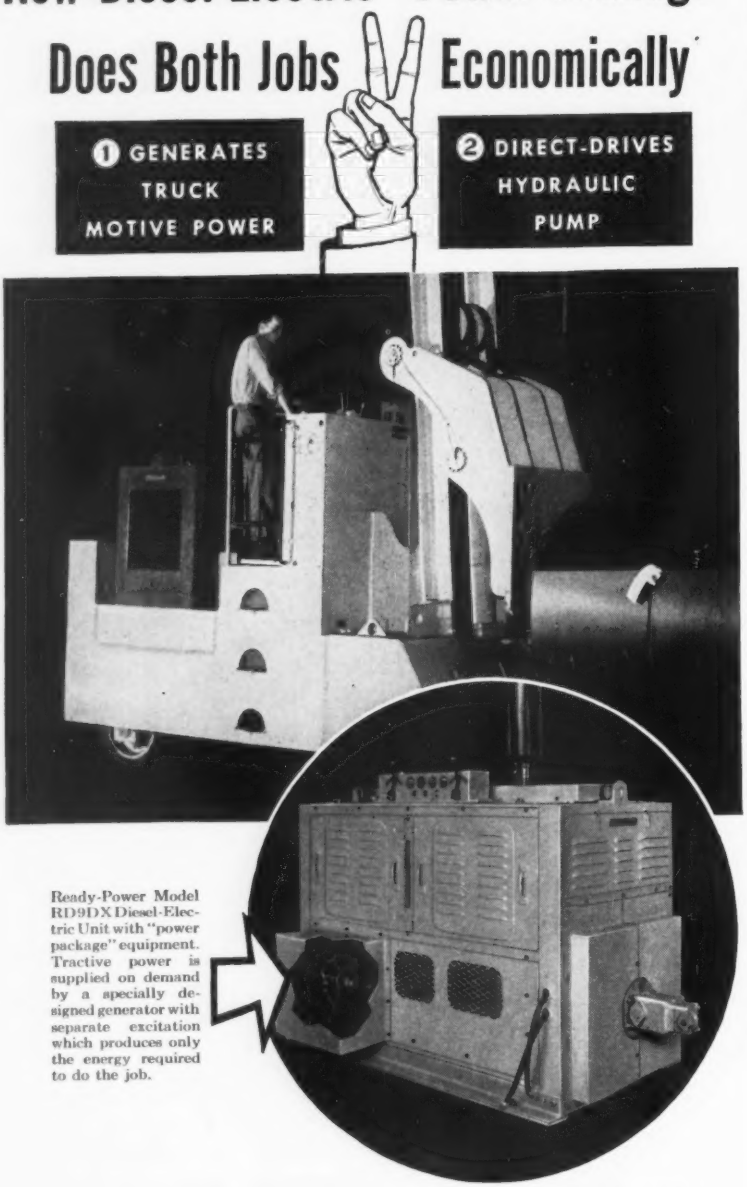
New Diesel-Electric "Power-Package" Does Both Jobs Economically



Ready-Power Model RD9DX Diesel-Electric Unit with "power package" equipment. Tractive power is supplied on demand by a specially designed generator with separate excitation which produces only the energy required to do the job.

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can Bridge Div. will construct the building. Construction will begin early in 1960 and will be completed in the same year.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 156 & 157

Cold rolled and galvanized sheets have been under buying pressure all along, and still are. Despite hedge buying prior to the strike, and summer influences, buyers of these grades remain concerned about inventories.

The probability that the strike will be prolonged has increased their anxiety; they are seeking tonnage for delivery as soon as available. This is true, for the moment at least, notwithstanding the fact that a lengthy strike would undoubtedly hurt the nation's economy seriously, and, in the process, adversely affect demand for end products made of steel.

At the time of the general walkout, the mills were behind on their commitments—two or three weeks on cold-rolled, and longer in some cases on galvanized. The two week extension of the labor agreement to July 15 helped the mills catch up some, but they weren't able to get out everything by the time the strike became effective.

Consumers want this unshipped tonnage, and more if they can get it. In hot rolled sheets and some flat rolled specialties, however, most producers are fairly well caught up with their shipment promises. But even in these items, consumer forward interest is evident, though no particular pressure is being applied.

With the general feeling prevailing that the strike will be prolonged, some sellers fear consumers' stocks will run pretty thin before it is over. At least, stocks that now appear adequate for some time ahead will be unbalanced before long. Realizing this gloomy possibility, many consumers, particularly the smaller ones, are seeking to get additional tonnage on makers' books.

In accepting new orders, the mills are following the policy of taking on no new customers, and of entering tonnage for their regular trade on the basis of a reasonable, normal delivery pattern that allows for delays occasioned by the strike.

The methods of handling new

orders vary to some extent among sellers whose mills are strikebound, but they add up to about the same thing. Some are holding orders until steel production is resumed, planning then to officially enter them on books for handling on a schedule as close as possible to desired delivery dates. However, no definite commitments are being made.

Buys Chip Handling System

Link-Belt Co., Chicago, acquired the patents and assets of the Teco continuous automatic metal chip handling system from Turbine Equipment Co., New York. The system upgrades chips and turnings by crushing them to a uniform size and extracts from them the oil or coolants.

Vacuum Cleaner Sales Are Up 13.8% This Year

Sales of standard-size domestic type vacuum cleaners in June were 273,649 units vs. 253,127 in June last year, an increase of 8.1 per cent, reports the Vacuum Cleaner Manufacturers Association.

For the six months ended June, unit sales were 1,708,865 vs. 1,501,-724 in the like period of 1958, an increase of 13.8 per cent.

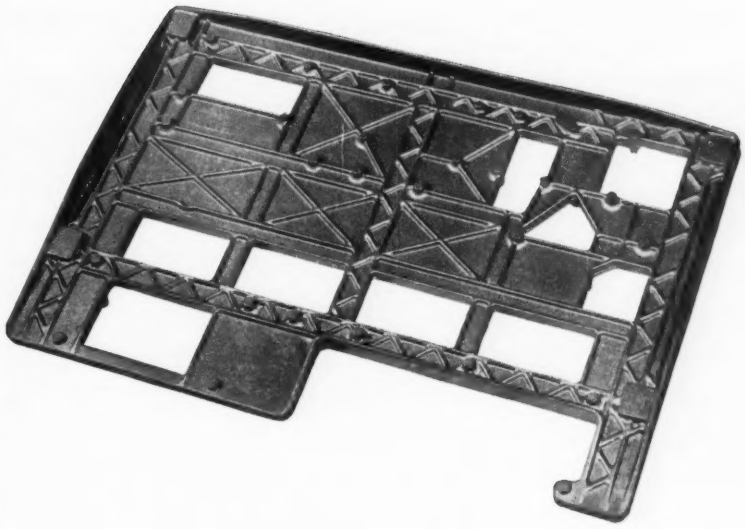
Plates . . .

Plate Prices, Page 155

While most plate mills now strikebound were fairly current on commitments at the time of the walkout, they are now accepting new orders for shipment three to four weeks after resumption of operations. In the case of heads and specialties, at least one mill is accepting little tonnage for delivery under five weeks after the strike.

Three eastern mills continued to operate after the July 15 strike deadline and under their labor agreements will continue to roll at a high rate at least until the end of the month. One mill that is likely to be closed down July 31 has been concentrating on the production of carbon plates at the expense of its alloy commitments, due to the extra processing involved in meeting specifications for most alloy plates.

The fact that several mills have



DUCTILITY

A CASE IN POINT—This ninety-six pound casting was made for the National Cash Register Co. of Nodulite®, Hamilton Foundry's ductile iron. The casting forms the base for the new Post-Tronic Accounting Machine. It measures 37½″ by 23½″ with sections varying from ¼″ to 1½″. Ductile iron was chosen for this part because of its ductility, dimensional stability, rigidity, and machinability.

Ductile iron has most of the engineering advantages of steel yet it can be designed with the same flexibility and cast with the same procedures used for gray iron. It has high strength: up to 120,000 psi minimum tensile strength in standard grades. It is tough: Charpy impact strengths up to 115 ft.-lbs. in standard grades. It is ductile: elongation is possible up to 25% after short time annealing. And it is wear resistant: spheroidal graphite particles provide for self-lubrication. Hamilton Foundry regularly casts 60-45-10, 80-60-03, 100-70-03, and 120-90-02 grades of ductile iron as well as high alloy Ductile Ni-Resist.

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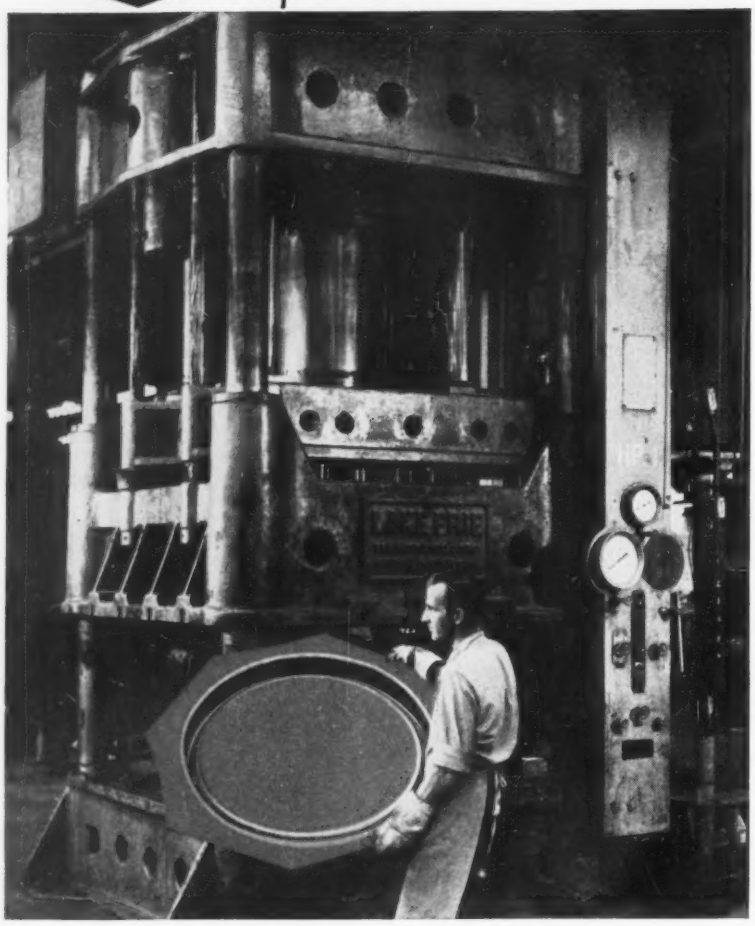
DOW | MAGNESIUM PRODUCTS



400-TON PRESS draws end pieces of magnesium transmitter housing for missile ground support electronic system. Heated dies make possible one step draws.

The electronic transmitter housing shown in various stages of production on this page is a good example of the type of work carried on at Dow's Bay City Fabrication plant. It is a large and complex assembly which is produced in quantity, involves many different operations, and must conform to extremely high quality standards.

Large or small jobs. The Bay City plant is a large, well equipped magnesium production facility set up to handle large or small jobs, and plenty of both. Its activities encompass every phase of fabrication — deep drawing, bending, spinning, stamping, piercing, machining, arc and spot welding, assembling, chemical treating and painting. The facilities are government certified.

Engineering and quality control. Dow engineers working closely with the customer are frequently able to suggest design modifications which cut costs and/or meet application requirements better. A quality control team using modern methods and equipment assures that high standards of craftsmanship are rigidly maintained.

Many "firsts". The Bay City Fabrication plant has pioneered many developments in the production of magnesium parts and products. They were first to hot draw the lightest structural metal, and first to spot weld and automatically weld it. They have also been a leader in the production use of chemical treatments and finishes for magnesium.

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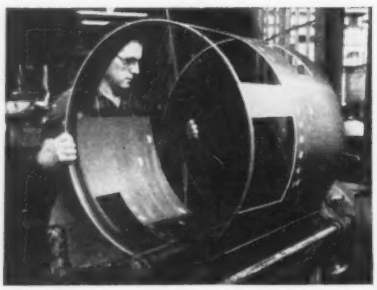
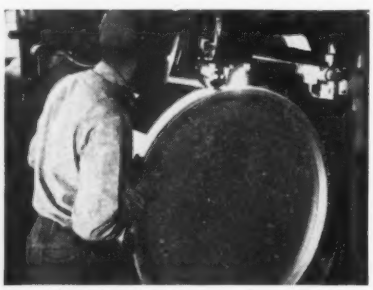


"WRAPPER", or shell of housing is roll formed of magnesium sheet.



AUTOMATIC ARC WELDER, using tungsten-inert gas process, joins end to wrapper.

ASSEMBLY involves attachment of doors, hardware, other components using riveting, bolting, welding.

THE DOW CHEMICAL COMPANY · MIDLAND, MICHIGAN

continued to operate, and also the substantial production in the first two weeks of this month resulting from the extension from June 30 to July 15 of the labor agreements, have served to ease the plant supply situation to some extent—taking into account the seasonal summer slack in requirements and strike hedge buying by most consumers. However, in light of the glum outlook for an early strike settlement, orders are still coming in at a fair rate, being accepted with the understanding rollings will be dependent upon the mills' convenience.

Equipment Maker Expands

An expansion program costing more than $2 million is nearing completion in the Process Equipment Div., A. O. Smith Corp., Milwaukee. The program includes construction of 80,000 sq ft of floor space and installation of heavy equipment, including a boring and turning mill for machining parts for pressure vessels and atomic energy equipment, a 20 ton and a 50 ton capacity welding positioner, a betatron for the testing of heavy welds, four sets of 250 ton capacity turning rolls, six sets of 90 ton turning rolls, and two large cranes with lifting capacities of 150 tons each.

Westinghouse Expanding

Westinghouse Electric Corp., Pittsburgh, will spend more than $25 million to expand and modernize facilities for the manufacture of turbines, generators, large motors, and related heavy apparatus. Largest segment of the program is a $21 million project that will increase capacity by about one-third at its Steam Div., Lester, Pa., on completion early in 1961. A $3 million expenditure at East Pittsburgh, Pa., will provide an additional 65,000 sq ft of manufacturing space for its Large Rotating Apparatus Dept. which builds generators. More than $1 million will be spent to boost the steam turbine manufacturing facilities at Sunnyvale, Calif. That program calls for more and larger machine tools, but no new buildings.

Structural Shapes . . .

Structural Shape Prices, Page 155

Although most fabricating shops hold fair backlogs, new orders are spotty, running largely to public construction, including highway work. Some of the larger fabricators are closed by the steel strike, but many of the smaller firms continue to operate, their agreements with the union not expiring immediately.

Supplies of plain structurals are reported to be fair. Most fabricators sought to protect jobs in hand by hedging against the strike. It's doubtful though, if inventories will be sufficient if the strike is prolonged. This is especially true with respect to wide flange beams. The steel service centers may be called upon to fill supply gaps to a greater extent than had first been thought.

It will probably be several weeks before the impact of the steel strike on construction activity generally is felt.

California paid an average price of 16½ cents a pound for structural steel going into public works, including highways, in the three months ended Mar. 31, unchanged from the average of the preceding three months. A volume of 5178 tons was used in the latest quarter, with the price ranging from 13 cents to 18 cents a pound.

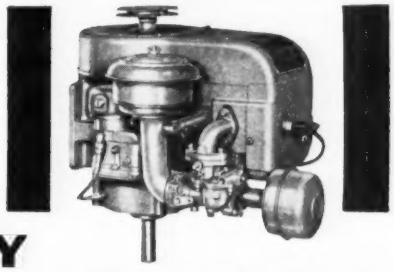
Early this month, Gov. William G. Stratton of Illinois put a freeze order on some $80 million in planned new construction until Jan.

STEEL WORKERS WANTED

A new, independent 100,000 tons per year hot strip, plate and structural steel mill is being built in Regina, Canada. Full personnel is required for start-up in January, 1960. Openings are available in all phases of steel making. All interested parties should give full particulars, salary expected, etc., on first writing.

Interprovincial Steel Corporation Ltd.,
Regina, Saskatchewan, Canada

Now presenting the Engine Industry's first line of



HEAVY-DUTY VERTICAL-SHAFT ENGINES

To meet the demand among discriminating original-equipment manufacturers for TOP-QUALITY vertical-shaft engines to match their machines, "Wisconsin" has developed and now presents the Industry's *first line* of truly HEAVY-DUTY, quality-built vertical-shaft power units, in a highly selective power range. Available in three sizes, rated from 2.5 to 9.2 hp. in a 1600- to 3600-rpm range, these rugged, low-silhouette engines have been designed to meet a broad diversity of applications, delivering higher power and service potential for greater user satisfaction.

"Wisconsin" All the Way: All traditional Wisconsin heavy-duty features are incorporated in the design and construction of these new engines. This includes tapered roller main bearings (both top and bottom); forged connecting rod and crankshaft; gear-driven, weather-sealed outside magneto with Impulse Coupling for easy starting at low cranking speed; positive lubrication to all engine parts by crankshaft-mounted vane-type impeller and jet spray.

If you are looking for this type of power, let Wisconsin engineers help you adapt these engines to your equipment. For a quick briefing on the WISCONSIN Vertical-Shaft Engine line, write for bulletin S-245.

WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

1. That was done because of an unbalanced state budget and not because of the steel strike. Some work may be reactivated if revenue picks up. Among major projects postponed are some $29.9 million in buildings planned with new funds for the University of Illinois, Southern Illinois University, teachers' colleges, a new state museum building, a new prison, and a school in southern Illinois for the mentally retarded.

Highway construction, funds for which come from gasoline taxes, are not affected. The $80 million to be frozen comes from general revenues.

The City of Chicago states its construction projects and the lake front exposition center will not feel the pinch of the steel strike for some time. The city has been stockpiling steel, and contractors on various city jobs have been building up their inventories.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

210 tons, transmission towers, Pennsylvania Power & Light Co. to Lehigh Structural Steel Co., Allentown, Pa.

STRUCTURAL STEEL PENDING

3250 tons, Jones Falls Expressway, Section 1G, Baltimore, bids to be opened by the city July 29.

3233 tons, state bridgework, Passaic and Bergen Counties, New Jersey, Public Constructors Inc., Blackwood, N. J., low on the general contract.

515 tons, hospital, Carlisle, Pa., R. S. Mowery & Sons, that city, low on the general contract.

125 tons, hospital, Ephrata, Pa.; bids asked.

REINFORCING BARS . . .

REINFORCING BARS PENDING

300 tons, alterations, convention hall, Atlantic City, N. J.; bids asked.

140 tons, shopping center, Cheltenham Township, Pa., near Philadelphia, to American Steel Engineering Co., that city.

140 tons, high school, Egg Harbor, N. J.; bids asked.

RAILS, CARS . . .

RAILROAD CARS PLACED

Wabash, 100 seventy-ton covered hopper cars, to Greenville Steel Car Co., Greenville, Pa.

Georgia & Florida, 100 fifty-ton boxcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Minneapolis & St. Louis, ten 50-ft and four 70-ft boxcars, to Pullman-Standard Div., Pullman Inc., Chicago.

New York City Transit Authority, 230 subway cars, to St. Louis Car Co., St. Louis.

Pennsylvania, 500 additional piggyback cars, with 300 going to Pullman-Standard Div., Pullman Inc., Chicago, and 200 to ACF Industries Inc., New York.

New York Central, 300 flatcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Steel Shipments by Market Classifications—May, 1959

(Net Tons; All Grades)

Markets:	May Shipments 1959	May Shipments 1958	First Five Months 1959	First Five Months 1958
Converting, processing	367,363	246,990	1,564,316	1,108,162
Forgings (except auto)	126,149	64,147	509,331	297,702
Fasteners	138,401	45,942	631,208	282,995
Warehouses:				
Oil & gas	247,364	55,585	1,030,355	359,357
All other	1,389,809	825,465	5,931,424	3,585,065
Total warehouse	1,637,173	881,050	6,961,779	3,944,422
Construction:				
Rail transportation	4,924	3,287	25,821	19,821
Oil & gas	340,274	231,400	1,305,248	830,051
All other	839,530	589,404	3,504,526	2,593,898
Total construction	1,184,728	824,091	4,835,595	3,443,770
Contractors' products	446,053	290,594	1,971,452	1,306,820
Automotive:				
Cars, trucks, parts	1,679,763	512,099	7,932,838	3,237,080
Forgings	57,231	14,849	247,262	91,321
Total automotive	1,736,994	526,948	8,180,100	3,328,401
Rail Transportation:				
Rails, track, equipment	122,799	52,295	531,595	297,650
Cars & locomotives	217,811	64,999	870,926	415,214
Transit systems	2,279	1,456	11,914	8,346
Total rail transportation	342,889	118,750	1,414,435	721,210
Shipbuilding	85,332	65,820	390,598	375,438
Aircraft	8,691	4,235	35,101	23,715
Oil, gas drilling	95,803	16,884	333,850	132,137
Mining, quarrying, etc.	36,149	19,787	127,878	80,790
Agricultural:				
Agricultural machinery	106,041	84,036	541,564	380,219
All other	38,961	28,461	163,472	94,559
Total agricultural	145,002	112,497	705,036	474,778
Machinery, tools, etc.	516,687	232,035	2,308,746	1,244,965
Elec. machinery, etc.	246,742	140,615	1,132,372	706,362
Appliances, etc.	211,487	105,999	1,018,582	572,319
Other equipment	220,842	140,186	1,018,576	656,951
Containers:				
Cans & closures	720,223	427,441	2,917,239	2,266,360
Barrels, drums, etc.	94,915	70,272	425,025	304,380
All other containers	68,581	41,277	302,615	185,271
Total containers	883,719	538,990	3,644,879	2,756,011
Ordnance, military	21,910	24,057	78,771	99,814
Nonclassified	110,937	53,951	482,686	262,435
Total domestic shipments	8,562,321	4,453,568	37,344,291	21,819,232
Exports	191,798	195,931	874,849	1,133,068
Total shipments	8,754,119	4,649,499	38,219,140	22,952,300

Data from American Iron & Steel Institute.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended July 26	Change	Same 1958	Week 1957
Pittsburgh	2.5	—24*	49	88
Chicago	5	—30*	62	82.5
Eastern	14	—21*	63	88
Youngstown	9	—24	52	77
Wheeling	51	—11.5	71	70.5
Cleveland	5.5	—21*	49.5	76
Buffalo	4	—26	44	90
Birmingham	9	— 4.5	53.5	87.5
Cincinnati	69	— 4*	39.5	62
St. Louis	93.5	+10.5	95	79
Detroit	24	—14.5*	58.5	88.5
Western	6	—69	67	100
National Rate	13.5	—25.2*	56	79.5

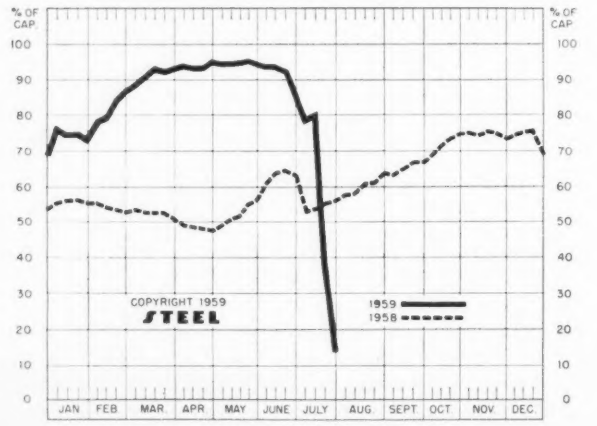
INGOT PRODUCTION

	Week Ended July 26	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	23.8†	68.3	154.8	96.2
NET TONS (In thousands)	382†	1,097	2,486	1,546

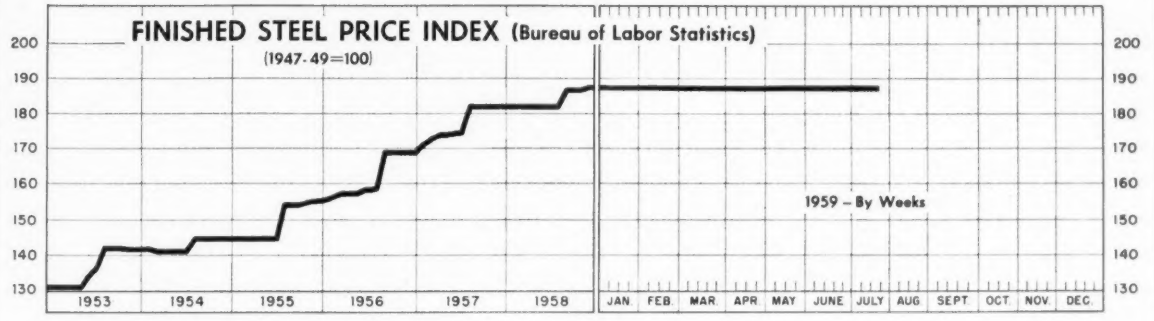
*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.

Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



July 21, 1959	Week Ago	Month Ago	June Avg.	Year Ago
186.7	**186.7**	**186.7**	**186.7**	**181.5**

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 21

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.385
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.615
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.905
Pipe, Galv., Buttweld (100 ft)	23.253
Pipe, Line (100 ft)	199.533
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.967
Nails, Wire, 8d Common	9.825
Wire, Barbed (80-rod spool)	8.722
Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	July 22 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	195.87
Index in cents per lb	6.713	6.713	6.713	6.479	5.306

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$117.43
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	38.67	38.67	36.50	37.67	27.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 22 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.725	4.55
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.225
Plates, Chicago	5.30	5.30	5.30	5.10	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.45
Strip, H.R. Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	4.05
Strip, C. R., Pittsburgh	7.425	7.425	7.425	7.15	5.75
Strip, C. R., Chicago	7.425	7.425	7.425	7.15	6.00
Strip, C.R., Detroit	7.425	7.425	7.425	7.15	5.60-5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	5.85
Tin plate(1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

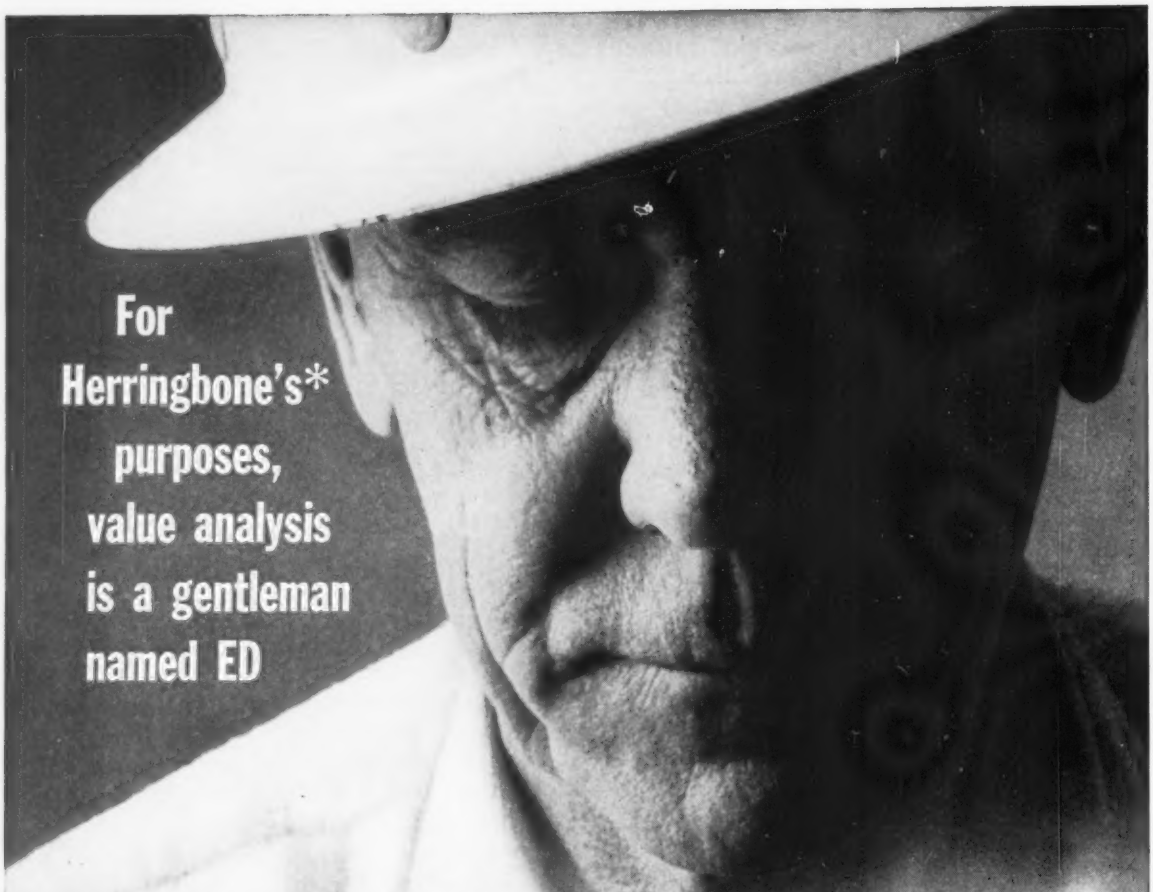
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$78.00
Wire rods $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.15	4.675

PIG IRON, Gross Ton	July 22 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	60.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry(Birm.)deld., Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$39.50	$39.50	$36.50	$37.50	$28.50
No. 1 Heavy Melt, E. Pa.	40.00	40.00	38.00	35.00	24.50
No. 1 Heavy Melt, Chicago	36.50	36.50	35.00	40.50	29.00
No. 1 Heavy Melt, Valley	41.50	41.50	39.50	41.50	26.50
No. 1 Heavy Melt, Cleve.	38.50	38.50	36.50	38.50	24.50
No. 1 Heavy Melt, Buffalo	33.50	33.50	33.50	27.50	26.50
Rails, Rerolling, Chicago	59.50	59.50	59.50	61.50	42.50
No. 1 Cast, Chicago	52.50	52.50	52.50	44.50	36.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	30.50	25.25



For Herringbone's* purposes, value analysis is a gentleman named ED

Or Joe, or Sven, or whatever the name of the man is in your organization whose opinion on wire rope you most respect. You can take all the value analysis forms ever made and fill them out and get some pretty promising answers. The straightest and clearest answer you'll ever get is from the head gentleman who *works* with the rope; the same man who comes back to you and tells you that the rope he works with *doesn't work*.

We take this stand because the new Roebling Herringbone is championed by men who work with it – the first to feel the impact of a wire rope's success or failure – and the first to tell you about either.

Roebling Herringbone–the two-ropes-in-one rope–is doing things that construction operators find hard to believe–but love to admit. It has prompted a series of some of the nicest testimonials you ever saw.

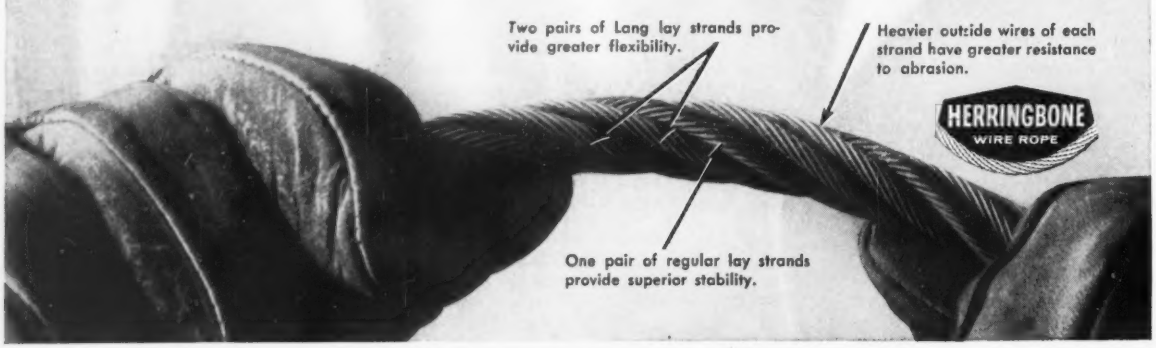
When you come right down to it, their satisfaction is twofold; after all they are working with both a Lang lay and regular lay rope in one. So they are getting the best that both types of rope construction have to give ...and that's plenty.

If you want to write us and get some pure, unadulterated field reactions, opinions from men who count, just drop a line to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey. With these, we'll take the liberty of sending you the complete information on the rope that makes value analysis a sure thing by the mere specifying... Roebling Herringbone.

*Reg. Appl. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation


Two pairs of Lang lay strands provide greater flexibility.
Heavier outside wires of each strand have greater resistance to abrasion.
HERRINGBONE
WIRE ROPE
One pair of regular lay strands provide superior stability.

Steel Prices

Mill prices as reported to STEEL, July 22, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 156; footnotes, page 158.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 ..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 ..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 ..119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.80
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown (27) R2 ..5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 ....7.95
Younstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. c.l. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 ....5.875
Atlanta (9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 ....5.675
Canton,O. (23) R2 ....6.15
Clairton,Pa.(9) U5 ..5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ....6.45
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O. (23) R2 ..6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle A24, B3, N14 ..6.425
S.Ch'e'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9)S5 ..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2 9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ....8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ....9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.375
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B2 ..9.075
LosAngeles P2, S30 ..11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.075
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ..9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 .....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S6 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14 5.675
S.Duquesne,Pa. U5 ...5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt) B14 19.00
McK.Rks.(S.R.) L5 ..14.50
McK.Rks.(D.R.) L5 ..19.80
McK.Rks.(Staybolt)L5 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa. (4) F5 ..5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 .5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 ....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 .6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 .6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ..6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9 275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875†
Ashland,Ky. A10 ....6.875†
Canton,O. R2 .....6.875†
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10 6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) B2 ....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity,Ill. G4 ....6.875
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 ....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.325
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Champan&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am.Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2 5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3 ..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 ....7.575
Conshohocken,Pa. A3..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 .7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3..8.325
SparrowsPoint Md. B2..7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 ....9.20
FranklinPark Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10..7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5 7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6..7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y. (32) R6 ..7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Wallingford Conn. W2..7.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 ....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. C18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23 30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C. R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5 7.425*
Worcester,Mass. A7 ..7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9 75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9 75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per lb)			
IndianaHarbor Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles O. R2 (20-27 Ga.)	7.90	8.10	8.30
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10 40	$10.65
Fairfield,Ala. T2	10 50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11 05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.30
Fairless,Pa. U5 .....8.30
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1.8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ...8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor, Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$10.05
Irvin,Pa. U5 .....10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 ....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ..8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S Chicago Ill. R2 .....8 00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....13.40
KansasCity,Mo. U3 ....12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ....13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 ....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ....10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg Calif. C11 ...10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....16.50
Bartonville Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8..16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
KansasCity,Mo. U3 ....13.70
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock — **Col.**

AlabamaCity,Ala. B2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) to Distributors (33)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.ïper 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$954
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.59

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — **Col.**

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2.	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	1940**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Cleveland A7	17.85	
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	
Kokomo C16	17.25	18.80†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.25	19.05††
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48)A11	9.10	9.775§
Bartonville(48) K4	9.10	9.80
Buffalo W12	9.00	9.55†
Cleveland A7	9.00	
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
Kans.City(48) S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70‡‡§
Struthers,O. Y1	9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50, †5c, ‡10c, §Less than 10c, ††10.50c, ‡‡11.00c, **Subject to zinc equalization extras, §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1¼ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolt
Full Size Body (cut thread)& Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated. Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam	50.0
¾ in. diam	47.0
⅞ and 1 in. diam	43.0
1⅛ and 1¼ in. diam	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy
Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in. incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
⅞ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:
6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+85.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.85, 7/16 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40.000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.40	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	....	43.40	55.40	73.00	....
Pueblo,Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mills bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c or cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt. Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: Carbon Base 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base Cold Rolled: 10%	Strip, Carbon Base Cold Rolled: Both Sides
Copper*	$36.20	$43.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward,Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville Homestead, Wilmerding Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. K2	89.00
Keokuk,Iowa O.H. & Fdry. 12½ lb piglet, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Troy,N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	10.07	11.12	11.92	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	10.85	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.50#	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	11.00	52.33	8.63	9.10	11.25#	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[2]	10.80[2]	12.20	57.60	9.15	9.10[2]	12.95[2]	16.35	9.00[2]	9.10[2]	11.30[2]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.30	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25#	15.05	9.00	8.89	10.20
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [5]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa. $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville,Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid. metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$12.50-13.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 91.5c-96.5c. nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00†
48% 2.8:1	38.00-40.00†
48% no ratio	29.00-31.00†

South African Transvaal

44% no ratio	19.75-21.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00†

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.73
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies).	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon, ⅜" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill Products (Per Base Box; 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots, (per keg) **400 keg min.**	$8.15

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.25
100 mesh, pails	9.10‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in x 1.3 in.	28.75
1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	36.00
Unannealed (99+% Fe) (minus 325 mesh)	59.00
Powder Flake (minus 16 plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500-lb drum, freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	*33.30-49.50†*
Bronze, 5000-lb lots	*50.50-54.60†*
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electolytic: Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	*51.50-56.00†*
Phosphor-Copper, 5000-lb lots	*62.80*
Copper (atomized) 5000-lb lots	*43.30*
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten: Carbon reduced, 98.8% min, minus 65 mesh	Dollars nom**
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scrafing grade. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.03	$6.03	$5.98	$5.88	$6.34
Bar Size Angles	6.03	6.03	5.98	5.88	6.34
Structural Angles	5.93	5.93	5.88	5.78	6.18
I Beams	5.93	5.93	5.88	5.78	6.18
Channels	5.93	5.93	5.88	5.78	6.18
Plates (basic bessemer)	5.70	5.70	5.65	5.55	5.95
Sheets, H.R.	7.00	7.00	6.95	6.85	7.25
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.30	9.30	9.25	9.15	9.65
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.45	9.45	9.40	9.30	9.70
Sheets, C.R. (drawing quality)	8.50	8.50	8.45	8.35	8.75
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.22	25.06	24.91	24.61	26.28
Barbed Wire (†)	7.15	7.15	7.10	7.00	7.40
Merchant Bars	6.08	6.08	6.03	5.93	6.33
Hot-Rolled Bands	6.00	6.00	5.95	5.85	6.25
Wire Rods, Thomas Commercial No. 5	6.10	6.15	6.10	6.00	6.35
Wire Rods, O.H.	*6.65*	*6.70*	*6.65*	*6.55*	*6.90*
Bright Common Wire Nails (§)	7.65	7.65	7.60	7.50	7.90

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome 1: Cr 63%, C 6% max, Si 7% max, 22c. **Charge Chrome 2:** Cr 50-59%, C 8% max, Si 6% max, 23c. Carload, lump, bulk, per lb Cr.

Refined Chrome 1: Cr 50-59%, C 5% max, Si 2% max, 25c. **Refined Chrome 2:** Si 12% max, 24c. Carload, lump, bulk, per lb Cr.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Delivered.

Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb or briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

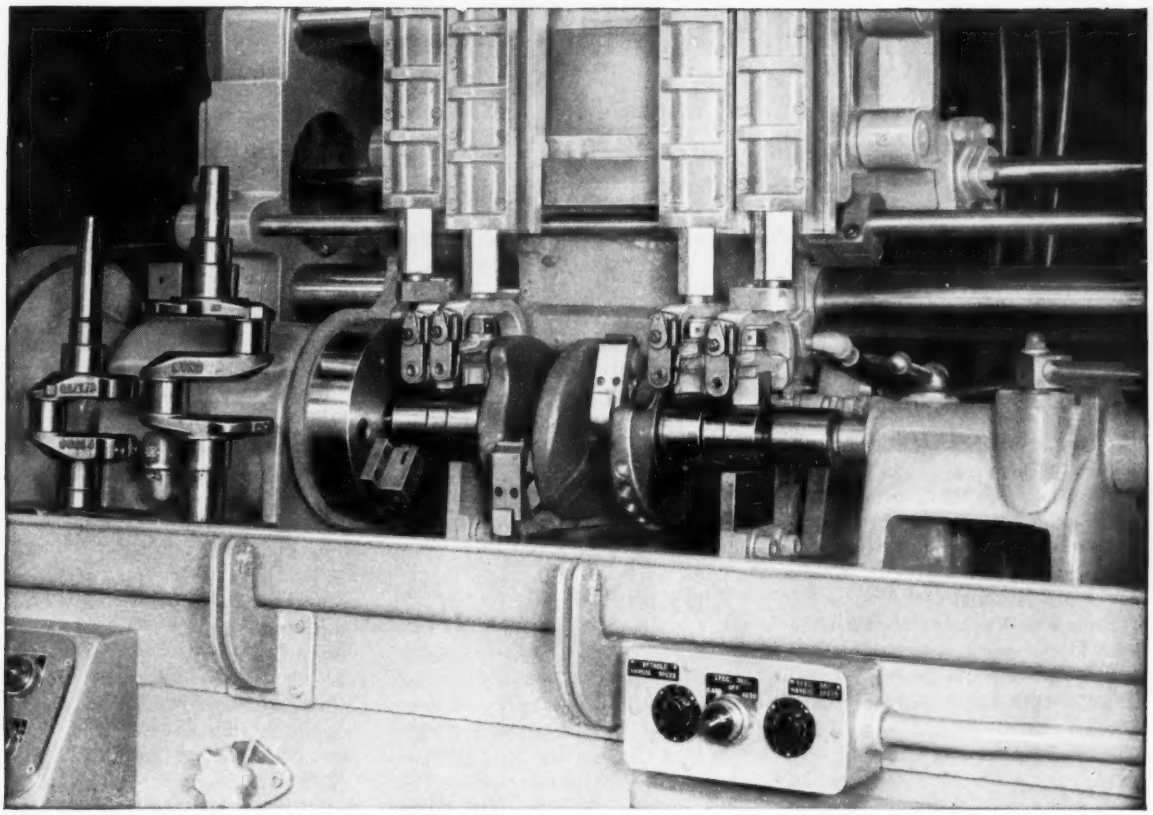
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo., in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



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Scrap Marking Time During Strike

STEEL's composite on No. 1 heavy melting holds unchanged at $38.67. Limited buying being done by mills still operating. Bids on monthend auto lists to point way for prices

Scrap Prices, Page 166

• **Pittsburgh**—Despite the absence of buying, scrap dealers here are bullish, anticipating higher prices when the mills resume buying after the strike. Based on last sales, No. 1 heavy melting is quoted $39-$40, but brokers and dealers say a more representative price would be $41-$42 and even higher, since consumers wouldn't be able to get any tonnage today at the $39-$40 price. Buyers for the steel mills, however, feel otherwise, holding current prices are nominal.

Some foundry material is moving with No. 1 cupola stronger at $45-$46. The railroad grades are unchanged with No. 1 railroad quoted $46-$47 based on the latest sale. The stainless grades of scrap are steady to strong, with 430 bundles and solids quoted higher than a week ago at $125-$130.

Brokers and dealers think the market will not show much change should the steel strike be short-lived. On the other hand, they feel a definitely stronger market will be experienced later this year should the walkout be prolonged. They reason that the blast furnaces would be slow to get back to full production necessitating greater use of scrap. Also, some observers think a shortage of iron ore may be felt next spring due to the shutting off of shipments during the strike.

• **Chicago**—Buying of steelmaking scrap is too limited to provide a market test. Major mills, idled by the strike, are marking time. Prices are unchanged. The next major movement will be the bids tendered for factory bundles offered by auto body plants at the end of this month. Demand for foundry grades of scrap reflects vacation closings of many shops in the district. August should provide a better test of the market.

• **Philadelphia**—Except for an advance of $1 a ton on low phos structurals and plates to $42-$43 delivered, prices are unchanged in this market. Although steady, the market on open hearth grades is strong due to active inquiry from abroad. Domestic demand is easing, but most yards in the area are said to have relatively little material on hand. Also, factory scrap is down considerably in volume due to mass vacations at many fabricating plants.

Dockworkers, on strike since early this month, resumed work July 22. This will relieve the congestion in export scrap at local piers.

• **New York** — Brokers' buying prices are unchanged. This applies not only to the major steel grades, but to cast iron and stainless scrap as well. Should the steel strike be prolonged, prices may soften, especially if some of the steel mills still operating are forced to close. Brisk export business is a steadying market factor at present.

• **Buffalo**—A leading district consumer of cast iron scrap has placed an order for cupola cast at $43 a ton. Demand for the cast grades continues fairly active, though some district foundries are closed for vacations.

There's no market for the steel grades here at present. Dealers continue to stockpile material and prices are unchanged, but lower quotations are expected if the steel strike is prolonged.

• **Cleveland**—With all local mills closed by the strike, scrap is marking time. Prices are unchanged but nominal in the absence of a buying test. Dealers think bids on the late July auto lists will point the way for prices over the next month. Some say tonnages to be offered will be smaller from here on until the new model season starts.

• **Detroit**—The market is soft and it looks like dealer prices will drop, possibly this week. Transactions are too few to provide a test, but the prospect of some bidding on Chrysler material has brought on a new round of speculative pricing talk.

Foundry scrap is slightly stronger than the steel grades, but prices in this area also appear weaker, though there have been no direct consumer buys.

• **Cincinnati**—Despite the absence of new orders, the market tone con-

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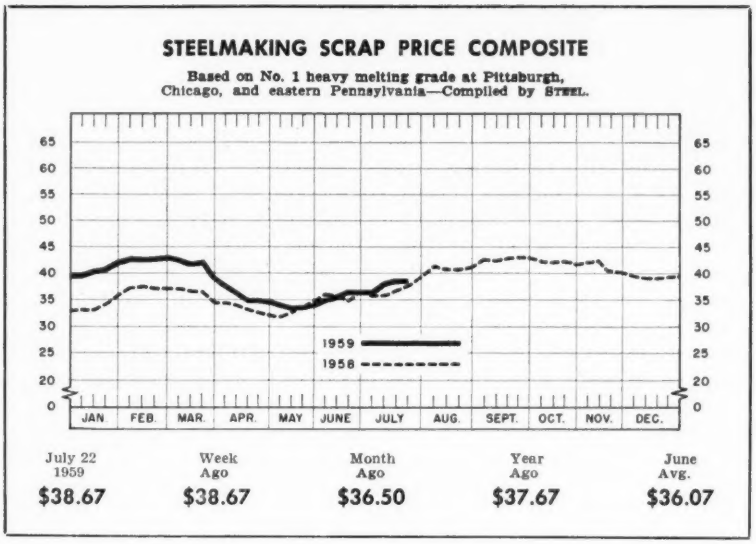


tinues firm. Prices moved up at the start of this month, and they are still holding at the higher level. A strikebound mill in the district is storing steelmaking scrap in local yards. Two large district steelmakers are operating; the employees of one are not members of the USW, and the other has been granted a contract extension.

• **St. Louis**—Prices are unchanged. The market is sluggish though both district mills are operating. Shippers are not pressing for orders, and brokers are not getting much in the way of new business.

• **Birmingham** — Scrap is moving fairly well in this district despite the closing down of mills by the strike. Electric furnaces and foundries were not affected and continue to buy. The Atlanta mill was granted a two week extension of its contract and bought some No. 2 heavy melting for immediate delivery at $4 above its last purchase price. Prices on the cast grades are firm.

• **Houston** — Brokers don't expect the steel strike to result in lower scrap prices. Local quotations are still based on the strikebound Houston mill's last buy.

Western Gulf export prices have settled at $38 for No. 1 heavy melting, $35 for No. 2, and $25 for No. 2 bundles. Louisiana shippers are quoted those prices f.a.s. for late August, and September delivery. The same quotations are in effect at Beaumont, Tex., and Baton Rouge, La., on an immediate delivery basis.

As the steel strike started, a 12,000 ton cargo was being loaded at Houston. There's a possibility additional vessel loadings will be scheduled if the steel strike is prolonged.

Texas shippers within the Mexican buying orbit are quoted $42 for No. 1 and $39 for No. 2 heavy melting, delivered the border. Those prices are $1 above last week's

Cast iron scrap prices are firm on moderate foundry demand.

• **Los Angeles** — Substantial tonnages are still moving for export. Over-all demand, though, is easier with the domestic mills not buying. It's still too early, however, to draw any sound conclusions with respect to the impact of the strike on the scrap market. The yards are building their accumulations.

• **San Francisco** — Effects of the steel strike have not had any reflection on scrap prices yet, though one large dealer said the market "is beginning to get heavy."

The 31,500-ton battleship *Maryland* is headed for the scrapper's torch. The *"Fighting Mary"* will be towed to Oakland, Calif. from Seattle in a couple of weeks to be broken up for scrap. The breakup will take about eight months.

Howe Sound Buys Foundry

Howe Sound Co., New York, purchased Crucible Steel Casting Co., Milwaukee, a division of Consolidated Foundries & Mfg. Corp., Chicago. Crucible will continue to make steel castings.

Pig Iron . . .

Pig Iron Prices, Page 160

Melters of merchant pig iron are not particularly worried by the sharp reduction in blast furnace operations.

Most foundries have sufficient inventories on hand to cover their requirements over the next several weeks. They had done considerable hedge buying in anticipation of the steel strike and many are or will be closed for vacations of varying periods through Labor Day.

Hot weather is exerting its usual influence in slowing activity at iron casting plants.

Supplies at the beginning of the strike are being augmented by some new production. About a dozen firms, including those operating captive stacks, continue normal schedules. That accounts for a capacity of some 200,000 tons of iron a week. In addition, offerings of foreign pig are being made.

Plans Beryllium Facility

Beryllium Corp., Reading, Pa., has joined Imperial Smelting Corp. Ltd., London, in establishing a new company, Consolidated Beryllium Ltd. It will be managed by Imperial Smelting, a subsidiary of Consolidated Zinc Corp. Ltd., and will operate a beryllium production facility being built at Avonmouth, England. Plans also include construction of a beryllium-copper alloy plant at that point.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 161

Production of coke in May totaled 6,384,126 net tons (6,244,122 oven, 140,004 beehive) reports the U. S. Bureau of Mines. In April, output amounted to 6,226,274 tons (6,074,002 oven, 152,272 beehive). In May last year, the total was 3,898,829 tons (3,862,390 oven, 36,439 beehive).

Production in the first five months of the year amounted to 30,152,512 tons (29,549,730 oven, 602,782 beehive). It compared with 20,917,994 tons (20,721,968 oven,

(*Please turn to Page* 171)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, July 22, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE SCRAP

July 22	$38.67
July 15	38.67
June Avg.	36.07
July 1958	37.54
July 1954	27.42

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	34.00-35.00
No. 1 dealer bundles	39.00-40.00
No. 2 bundles	*26.00-27.00*
No. 1 busheling	41.00-42.00
No. 1 factory bundles	48.00-49.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	26.00-27.00
Cast iron borings	26.00-27.00
Cut structurals:	
2 ft and under	47.00-48.00
3 ft and under	46.00-47.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	47.00-48.00

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Stove plate	45.00-46.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	46.00-47.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	58.00-59.00
Random rails	53.00-54.00
Angles, splice bars	53.00-54.00
Railroad specialties	53.00-54.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	115.00-120.00
430 bundles & solids	*125.00-130.00*
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	37.00-38.00
No. 1 hvy melt., dealer	35.00-36.00
No. 2 hvy melting	33.00-34.00
No. 1 factory bundles	41.00-42.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	24.00-25.00
No. 1 busheling, indus.	37.00-38.00
No. 1 busheling, dealer	35.00-36.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals, 3 ft	45.00-46.00
Punchings & plate scrap	46.00-47.00

Cast Iron Grades

No. 1 cupola	52.00-53.00
Stove plate	49.00-50.00
Unstripped motor blocks	43.00-44.00
Clean auto cast	58.00-59.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
R.R. malleable	59.00-60.00
Rails, 2 ft and under	55.00-56.00
Rails, 18 in. and under	56.00-57.00
Angles, splice bars	50.00-51.00
Axles	59.00-60.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	110.00-115.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	30.00-31.00
No. 1 busheling	41.00-42.00
No. 1 bundles	42.00-43.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.00-18.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	44.00-45.00
Electric furnace bundles	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	43.00-44.00
No. 1 bundles	38.00-39.00
No. 2 bundles	25.00-26.00
No. 1 busheling	38.00-39.00
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	40.00-41.00
Cut structurals, plates 2 ft and under	46.00-47.00
Low phos. punchings & plate	39.00-40.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	39.00-40.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	38.00-39.00
Heavy breakable cast	38.00-39.00
Stove plate	44.00-45.00
Unstripped motor blocks	36.00-37.00
Brake shoes	36.00-37.00
Clean auto cast	52.00-53.00
Burnt cast	37.00-38.00
Drop broken machinery	52.00-53.00

Railroad Scrap

R.R. malleable	65.00-66.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails, random lengths	52.00-53.00
Cast steel	46.00-47.00
Railroad specialties	48.00-49.00
Uncut tires	42.00-43.00
Angles, splice bars	51.00-52.00
Rails, rerolling	58.00-59.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	125.00-130.00
430 turnings	45.00-55.00

ST. LOUIS
(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	31.00
No. 1 bundles	37.00
No. 2 bundles	23.00
No. 1 busheling	37.00
Machine shop turnings	14.00
Short shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	51.00
Charging box cast	42.00
Heavy breakable cast	40.00
Unstripped motor blocks	41.00
Clean auto cast	54.00
Stove plate	46.50

Railroad Scrap

No. 1 R.R. heavy melt.	40.00
Rails, 18 in. and under	50.00
Rails, random lengths	44.00
Rails, rerollling	58.00
Angles, splice bars	48.00

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	38.00-39.00
No. 2 bundles	23.00-24.00
No. 1 busheling	38.00-39.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	27.00-28.00
Bar crops and plates	*45.00-46.00*
Structurals & plates	*44.00-45.00*
Electric furnace bundles	38.00-39.00
Electric furnace: 3 ft and under	37.00-38.00
2 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	55.00-56.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	*43.00-44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	37.00-38.00
Rails, 18 in. and under	*52.00-53.00*
Rails, rerolling	56.00-57.00
Rails, random lengths	*46.00-47.00*
Angles, splice bars	45.00-46.00

PHILADELPHIA

No. 1 heavy melting	40.00
No. 2 heavy melting	35.00
No. 1 bundles	40.00-41.00
No. 2 bundles	26.00-28.00
No. 1 busheling	40.00-41.00
Electric furnace bundles	42.00
Mixed borings, turnings	20.00†
Short shovel turnings	24.00-25.00
Machine shop turnings	20.00
Heavy turnings	34.00
Structurals & plate	*42.00-44.00*
Couplers, springs, wheels	45.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast.	43.00-45.00
Drop broken machinery	49.00-50.00
Malleable	67.00-68.00

NEW YORK
(Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	27.00-29.00
No. 1 bundles	30.00-31.00
No. 2 bundles	19.00-20.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	12.00-13.00†
Short shovel turnings	13.00-14.00†
Low phos. structurals & plates	36.00-37.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	23.00-24.00
No. 1 busheling	33.00-34.00
Short shovel turnings	21.00-22.00
Machine shop turnings	17.00-18.00
Cast iron borings	19.00-20.00
Low phos structurals and plate, 2 ft and under	43.00-44.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	46.00-47.00

Railroad Scrap

Rails, random lengths	45.00-46.00
Railr. 3 ft and under	51.00-52.00
Railroad specialties	43.00-44.00

CINCINNATI
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.50-36.50
No. 2 heavy melting	30.50-31.50
No. 1 bundles	35.50-36.50
No. 2 bundles	25.00-26.00
No. 1 busheling	35.50-36.50
Machine shop turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	21.00-22.00
Cast iron borings	20.00-21.00
Low phos., 18 in.	45.00-46.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable cast	42.00-43.00
Charging box cast	*42.00-43.00*
Drop broken machinery	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	47.00-48.00

HOUSTON
(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	34.00
No. 2 bundles	21.00
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	43.00-44.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Heavy breakable	*33.00*
Foundry malleable	42.00-43.00
Unstripped motor blocks	38.50-39.50

Railroad Scrap

No. 1 R.R. heavy melt.	34.00

BOSTON
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	20.00-20.50
No. 1 bundles	26.00-27.00
No. 1 busheling	26.00-27.00
Machine shop turnings	10.00-11.00
Short shovel turnings	12.00-13.00
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT
(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	22.00-23.00
No. 1 bundles	*35.00-36.00*
No. 2 bundles	21.00-22.00
No. 1 busheling	*33.00-34.00*
Machine shop turnings	*12.00-13.00*
Mixed borings, turnings	*13.00-14.00*
Short shovel turnings	*14.00-15.00*

Cast Iron Grades

No. 1 cupola	*47.50-48.50*
Stove plate	39.00-40.00
Heavy breakable	40.00-41.00
Unstripped motor blocks	29.00-30.00
Charging box cast	40.00-41.00
Clean auto cast	*51.00-52.00*

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	33.00†
No. 1 bundles	27.00†
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1.	38.00†

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast.	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*37.00*
No. 1 bundles	*36.50*
No. 2 bundles	20.00
Machine shop turnings	18.50
Shoveling turnings	20.50
Cast iron borings	19.00
Cut structurals and plate 1 ft and under	*48.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	41.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	33.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Short shovel turnings	16.00
Cut structurals, 3 ft	42.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.
(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory: Prepared	32.25
Unprepared	26.25
Short steel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

†Nominal.
‡F.o.b. Hamilton, Ont.

FAMOUS FALLACIES *about industrial advertising*

Advertising leaves less money for profits

J. H. Jewell refutes this one...

Mr. J. H. Jewell, vice president in charge of marketing, Westinghouse Electric Company, says: "*Well-planned industrial advertising is a cause — never just a result—of sales and profits. In today's economy the quality of communications in selling is as important as the quality of production equipment.*"

Progressive managements realize they must make effective use of all the channels of communicating with markets — salesmen, publication advertising, direct mail, trade shows, catalogs, films — if enough products are to be sold to insure full-scale employment and full use of production facilities.

Advertising has been proven to be the lowest-cost way of making up people's minds. It reaches more people, more often, with *carefully-controlled* messages.

When salesmen call on people who have been preconditioned by advertising, their task is easier, their own efforts more effective.

That is why more and better industrial advertising leads to a greater share of market preference — and greater profits.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 MADISON AVENUE, NEW YORK 16, NEW YORK

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., TULSA, YOUNGSTOWN.

Metalmen Sweat Out Strike

During steel walkout, sales of zinc, nickel, and tin will slip the most. Producers hope to recoup losses after it is over. Steel settlement will set nonferrous pattern

Nonferrous Metal Prices, Pages 170 & 171

METALMEN in the nonferrous field are looking at the steel strike as more of a nuisance than a direct threat to their business, but for some it has more than passing interest.

Hardest hit saleswise will be the zinc, nickel, and tin industries which rely on steelmakers for a substantial portion of their business. Most others simply hope the walkout doesn't last long enough to disrupt business in general and spoil their sales in the last half of the year. And most of them are watching carefully for the settlement terms, because they probably will have to follow the pattern.

• **Zinc**—About half of the zinc industry's sales go to the steel industry for galvanizing sheets, pipe, and wire. Lately, that has amounted to about 35,000 tons a month. One industry spokesman tells STEEL that the immediate impact will be a decline of about 20,000 tons a month in shipments. If the strike drags on and hampers production in autos and other hard goods, the decline will be much greater.

Meanwhile, stocks will climb. The industry will not cut back mine production unless the steelmakers are shut down longer than six or eight weeks. It probably will accumulate ores and concentrates and cut smelter output. Stocks now are about 169,000 tons at the smelters. In 1958, they reached 258,000 tons. "I doubt that we'll reach that level this year. But if the strike goes more than six weeks, all bets are off," says STEEL's informant.

The market was firm before the strike, and most observers feel it will rebound after the settlement. There is the possibility of a price decline if the strike is a long one, but most feel it would be illogical to cut prices now. Any losses during a six week stoppage probably could be regained by yearend.

Right now, it looks like the lead-zinc labor situation will maintain the status quo—no strike. Mine & Mill workers are operating under contract extensions, waiting to see what the pattern in steel will be.

• **Nickel**—Steelmakers account for about 40 per cent of nickel sales, mostly for stainless steel. That has dried up since July 15, but nickel company officials are not worried because they feel that they will make up any lost sales before yearend. They are worried a little about the effects on consumer purchases of autos, appliances, and other hard goods using nickel products. Too many postponed purchases will affect nickel sales to manufacturers of those items for as much as a year. Production won't be cut back.

*Steel used in manufacture. †Record year.
Source: U.S. Department of Commerce.

• **Aluminum**—Since steel producers are not big customers of the aluminum industry (they take about 2 per cent of total shipments a year), producers of the light metal are not concerned about a direct loss due to the strike. But the labor settlement is important to them because they too deal with the United Steelworkers. There are rumors that Dave McDonald, the steelworkers' president, may try to get a settlement in aluminum to use as a wedge in the steel case. But there is still the distinct possibility that when the contracts expire on July 31, aluminum workers will walk out.

• **Tin**—Look for stocks of tin to climb sharply. Makers of tin plate are by far the industry's biggest customers. Consumption of tin plate in canmaking was just building up to the pace of 1956 and 1957 (see graph) after a slow start in 1959. Now that market has virtually dried up. But it will rebound quicker than some others, because the strike is likely to be settled about the time fall canning season gets underway. The price of tin probably will weaken temporarily.

• **Copper, Lead**—These two metals will be the least affected of all the major metals because the steel industry is such a minor customer. But the labor settlement will be of major importance to them, since they will probably follow the pattern.

NONFERROUS PRICE RECORD

	July 22 Price	Last Change	Previous Price	June Avg	May Avg	July, 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	24.000
Copper	29.50-30.00	July 16, 1959	29.00-30.00	31.490	31.750	26.125
Lead	11.80	May 7, 1959	11.30	11.800	11.700	10.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	102.25	July 22, 1959	102.125	104.284	103.080	94.950
Zinc	11.00	Feb. 25, 1959	11.50	11.000	11.000	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig 99.8%, Velasco, Tex.

GENERAL ELECTRIC DESIGNS NEW FURNACE FOR HIGH-TEMPERATURE VACUUM OPERATIONS

Versatile new radiation shield furnace breaks heat barriers of conventional furnaces for critical super-alloy heating jobs

These new General Electric radiation shield furnaces give you faster heating and cooling cycles than you can obtain with your present hot retort furnaces. But in addition, they offer unmatched versatility for your future heating needs which hot retort furnaces can't possibly handle.

G-E radiation shield furnaces have been designed to operate from 1900 F to 2600 F, and in smaller sizes up to 4200 F. They can be used with vacuum, or with inert or hydrogen atmospheres. They are readily adaptable for the heat treatment, brazing and sintering of super-alloy stainless steel, and metals like titanium and zirconium.

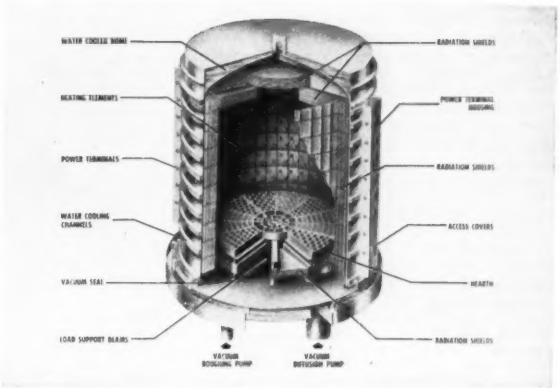
In addition to the versatility of higher temperatures and atmospheres, there's no metal retort between the heating units and the work in a radiation shield furnace. You get fast heating. And rapid cooling rates are provided by G.E.'s new cooling system that allows rapid recirculation of the cooling medium. Because of the more rapid heating and cooling cycles, a single radiation shield furnace can often do the work of a hot retort furnace with two bases and retorts . . . and give you substantial savings in floor space.

If you heat treat super alloys, seriously consider the advantages of a new G-E radiation shield furnace. You'll find General Electric engineers have the knowledge and design skill to match a furnace to your needs. Call your G-E Heating Specialist. Contact your nearby General Electric Apparatus Sales Office, or write Section 721-24, General Electric Company, Schenectady 5, New York.

GENERAL ELECTRIC

TYPICAL APPLICATIONS	Stress Relief	Annealing	Brazing	Sintering	Solution Heat Treatment	Degassing
Stainless Steels	X	X	X	X	X	X
Super Alloys	X	X	X	X	X	X
Tungsten	X	X	X	X	X	X
Tantalum	X	X	X	X	X	X
Molybdenum	X	X	X	X	X	X
Columbium (niobium)	X	X	X	X	X	X
Titanium	X	X	X	X	X	X
Vanadium	X	X	X	X	X	X
Zirconium	X	X	X	X	X	X
Hafnium	X	X	X	X	X	X

***Chart shows wide range** of applications possible with G.E.'s new radiation shield furnace; typifies G.E.'s ability to provide correct heat treating equipment to meet almost every need.*



***The new radiation shield furnace** is another example of General Electric pioneering in the field of high-temperature heat treating. This furnace is rated from 1900 to 2600 F, in smaller sizes up to 4200 F.*

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots 26.80, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.30 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 29.50; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, less than 1 kg, 38.30 per gram; 1-10 kg, 33.30 per gram; 10 kg or more, 31.30 per gram; intrinsic grade, 33.30-35.30 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 nom. per troy oz.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $234-236 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., $9.85 per lb in lots of 2500 lb or more, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $2.00-2.20 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 102.25.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 14.00; No. 2, 14.50; No. 5, 14.25 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.00-27.75; No. 12 foundry alloy (No. 2 grade), 23.75-24.00; 5% silicon alloy, 0.60 Cu max., 25.00; 13 alloy, 0.60 Cu max., 25.00; 195 alloy, 26.75-27.00; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.25; grade 3, 22.25; grade 4, 21.50.

Brass Ingot: Red brass No. 115, 29.25; tin bronze, No. 225, 39.75; No. 245, 33.50; high-leaded tin bronze, No. 305, 33.50; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.895, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.875, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 35.355; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.29; l.c.l., 37.04.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

(Prices per lb, c.l., f.o.b. mill) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.26
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ⅜ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-75.30	90.60-91.30
36-38	66.10-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.50-23.00; No. 2 heavy copper and wire, 20.50-21.00; light copper, 18.50-19.00; No. 1 composition red brass, 17.00-17.50; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	26.000	26.000	25.250
Yellow Brass	47.24	31.81d	47.78	50.65	19.625	18.750	17.750
Low Brass, 80%	50.03	47.97	50.57	53.34	22.000	21.750	21.250
Red Brass, 85%	51.02	50.96	51.56	54.33	22.875	22.625	22.125
Com. Bronze, 90%	52.55	52.49	53.09	55.61	23.875	23.625	23.125
Manganese Bronze	55.61	49.30	59.74	....	18.375	18.125	17.500
Muntz Metal	49.95	45.26	....	....	18.375	18.125	17.625
Naval Brass	51.90	45.71	58.46	55.31	18.250	18.000	17.500
Silicon Bronze	59.23	58.42	58.77	76.91	25.500	25.250	24.500
Nickel Silver, 10%	62.85	65.18	65.18	....	24.500	24.250	12.250
Phos. Bronze	73.92	74.42	74.42	75.60	27.125	26.875	25.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 16.00-16.50; new brass clippings, 14.50-15.00; light brass, 10.50-11.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 13.25-13.50; cocks and faucets, 13.00-13.50; brass pipe, 13.00-13.50.

Lead: Soft scrap lead, 7.75-8.25; battery plates, 2.50-3.00; linotype and stereotype, 9.25-9.75; electrotype, 7.75-8.25; mixed babbitt, 9.75-10.25.

Monel: Clippings, 30.00-32.00; old sheets, 26.00-28.00; turnings, 20.00-22.00; rods, 30.-00-32.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.25-3.50; new diecast scrap, 3.00-3.25; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 7.25-7.75; segregated low copper clips, 14.75-15.25; segregated high copper clips, 14.25-14.75; mixed low copper clips, 15.00-15.50; mixed high copper clips, 12.25-12.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 17.25-17.75; segregated high copper clips, 16.25-16.75; mixed low copper clips, 16.50-17.00; mixed high copper clips, 15.75-16.25.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 26.00; No. 2 heavy copper and wire, 24.00; light copper, 21.75; refinery brass (60% copper) dry copper content, 23.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 26.00; No. 2 heavy copper and wire, 24.00; light copper, 21.75; No. 1 composition borings, 19.50; No. 1 composition solids, 20.00; heavy yellow brass solids, 14.25; yellow brass turnings, 13.25; radiators, 15.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.30.

Copper: Flat-rolled, 46.29; oval, 44.50, 5000-10,000 lb; electrodeposited, 36.00, 2000-5000 lb lots; cast, 41.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; wire, 27.00; No. 2 heavy copper and wire, 26.00, light copper, 23.75; refinery brass deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 120.50; 200-499 lb, 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.30 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,-000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 14.95; 2000-5900 lb, 12.95; 6000-11,900 lb, 12.70; 12,000-22,900 lb, 12.45; 23,000 lb or more, 11.95.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 79.50; 100-600 lb, 70.20; 700-1900 lb, 67.40; 2000-9900 lb, 65.60; 10,000 lb or more, 64.20.

Stannous Chloride (Anhydrous): 25 lb, 155.00; 100 lb, 150.10; 400 lb, 147.70; 800-19,900 lb, 106.80; 20,000 lb or more, 100.70.

Stannous Sulphate: Less than 50 lb, 140.20; 50 lb, 110.20; 100-1900 lb, 108.20; 2000 lb or more, 106.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 165)

196,026 beehive) in the like period of 1958.

Producers' stocks of oven coke at the end of May totaled 3,150,104 tons, equal to 15.6 days' supply. At the end of May a year ago, stocks were 3,886,162 tons, equal to 28.3 days' supply.

Oven-coke breeze production in the month was 394,990 net tons vs. 403,861 in April, and 255,133 tons in May a year ago.

Tin Plate . . .

Tin Plate Prices, Page 157

Shipments of metal cans in May totaled 400,442 tons vs. 386,445 in April, and 386,895 in May last year, reported the Bureau of the Census. The total for the first five months this year was 1,748,371 tons vs. 1,670,896 in the like 1958 period.

The movement of fruit and vegetable cans amounted to 104,348 tons vs. 93,743 in April, and 85,883 in May, 1958. The cumulative total for the first five months was 415,486 tons vs. 426,580 in the same period of last year.

Beer can shipments (second largest category) were 84,198 tons in May vs. 77,084 in April, and 77,-906 in May a year ago. The total for the first five months was 326,-918 tons.

American Coal Moving To Argentine Steelworks

American coal for Argentina's expanding steel industry started pouring through the port of Norfolk, Va., last week. The first shipment on a 1-million-ton contract was made. It opens a major new market. Representatives of the Argentine embassy and of the five groups participating in the undertaking gathered at the Norfolk & Western Railway's Lamberts Point piers as the *Carl Fritzen* took 11,300 tons of West Virginia metallurgical coal aboard. It is destined for South America's first complete steel mill—from ore to finished products—at San Nicolas, 150 miles up the Parana River from Buenos Aires.

The coal came from the Keystone, W. Va., mine of Eastern Gas & Fuel Associates. This company will supply 225,000 tons under the contract with Sociedad Mixta Siderurgica Argentina (SOMISA), the firm which is building the General Savio plant at San Nicolas.

Tubular Good . . .

Tubular Goods Prices, Page 159

The strike cut off shipments from the tube mills at midmonth so that volume for July will fall noticeably under that reported for June. The movement in July, right up to the strike deadline, had been behind that of the preceding month, probably because downriver stocks of oil country pipe and tubing had been built up during June.

Line pipe order books of the mills are reported pretty well sold out for September. However, they've booked little for fourth quarter delivery.

Rotary oil drilling operations declined 57 units in the week ended July 13. The Hughes Tool Co. survey showed 2191 rigs at work, 389 more than in the same week a year ago.

A record tonnage of line pipe was shipped by the mills during May. The total was 443,181 net tons. Shipments of pipe and tubing in the month were also at a new high—1,140,669 net tons. The pre-

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FOR SALE LESS THAN MILL PRICE
NEW PLATE

90 tons 5/16 x 18 x 72 nickel chrome moly SAE 8630 annealed, P. & O. on skids.
BARKSDALE MFG. CO.
Blytheville, Ark.

Opportunities

MODERN HEAVY-DUTY PLANT
FINEST PLANT IN THE N. Y.-N. J. AREA—82,000 SQ FT.—10 1/3 ACRES—HEAVY POWER INSTALLED—AIR COND. OFFICES—RAILROAD—SPRINKLERED—2 YEARS OLD—CHOICE LOCATION. IMMEDIATE POSSESSION. SOLE AGENTS; LOUIS SCHLESINGER COMPANY INDUSTRIAL REAL ESTATE SINCE 1890. 901 BROAD ST., NEWARK 2, N. J., MARKET 2-6500.

Positions Wanted

POSITION WANTED: With efficient and aggressive Ornamental Iron, Aluminum and Stainless Steel Fabricator requiring the services of a top grade man capable of assuming complete charge of engineering and estimating and the coordinating of various departments. Very good draftsman and engineer with very broad experience in complicated work. Age 49 years, neat appearance, good health, and very good references. Could be available within sixty days. Reply Box 777, STEEL, Penton Bldg., Cleveland 13, Ohio.

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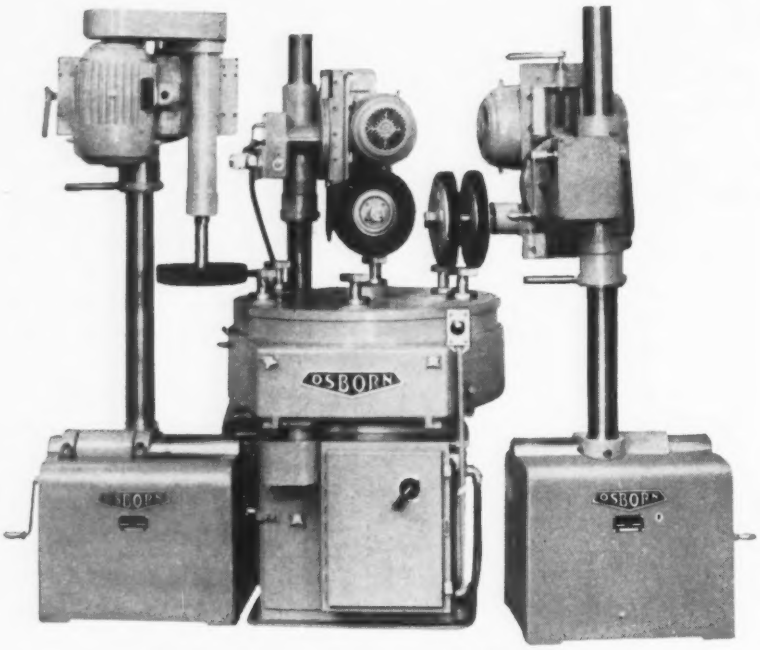
NEW OSBORN BRUSHAMATIC® ROTARY INDEX MACHINE



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Units can range from manual to fully automatic operation.

Unique "building block" design means unlimited production flexibility

NEWEST ADDITION to Osborn's broad line of metal finishing machines are these Brushamatic® Rotary Index units. Capability: significant increase of your production capacity.

Most important feature—production men can economically "build" *custom* Brushamatic Machines from *basic "building block"* components . . . brushing heads, index tables and electric controls. Other advanced design and construction features make these new Brushamatic units worth your immediate investigation.

Your Osborn field specialist has latest application data on a wide range of cost-saving finishing methods. And an **O**sborn **B**rushing **A**nalysis—made in your plant—is the first step to pinpoint savings on *your* operations. Write for details. *The Osborn Manufacturing Company, Dept. S-10, Cleveland 14, Ohio.*

THE OSBORN MANUFACTURING COMPANY

METAL FINISHING MACHINES...AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES
FOUNDRY PRODUCTION MACHINERY

OSBORN®

vious record of 1,113,336 tons was set in April this year.

Inland Accepting Orders For Tri-Steel Products

Inland Steel Co., Chicago, is accepting orders for its newly introduced Tri-Steel, which it is producing in bars, plates, standard structurals, wide flange beams, hot rolled strip, and hot rolled sheets. Tri-Steel can be specified to meet the requirements of ASTM A-242. Heretofore, the company could furnish only Hi-Steel to meet the requirements of an unmodified ASTM A-242.

Tri-Steel prices are: Bars, $7.925 per 100 lb; plates, $7.625; standard structurals, $7.75; wide flange beams, $7.75; hot rolled strip, $7.575; hot rolled sheets, $7.525.

Distributors . . .

Prices, Page 160

Pressure for delivery of steel products from service centers has not developed. Distributors say not enough time has elapsed for an upsurge to start. They do report that they have received some inquiries from consumers who are normally mill buyers. A few large orders are beginning to appear.

Consumers who are not already customers of service centers have little chance of being accommodated. The distributors hope to serve their regular customers during any period of stringency.

July and August are normally slow months because of mass vacations in the metalworking industry. The lag in demand is being cushioned by the effects of the strike, and if it continues well into August, the seasonal influence will be completly overshadowed.

Distributors have substantial and well balanced stocks. They believe these will last them through the emergency if alloted with caution. They are attempting to eliminate speculative buying and to maintain as wide a distribution as possible.

Distributors on the West Coast are obtaining supplies in small quantities from local mills that continue to operate. There has been little indication of stockpiling in that area by users of plates, structurals, or sheet items over and above current requirements.

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TO FIND THE MAN YOU NEED...

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly

ROLLWAY MAXIMUM BEARINGS

. . . . . What's the limit: Heat? Shock? Speed? Or complicated radial and thrust loads?

Name the combination of requirements . . . and chances are you'll find them met by a Rollway Maximum precision radial cylindrical roller bearing. If not, then Rollway engineers will modify any factor to meet your application.

Rollers are crowned to prevent end-loading and the resultant spalling of races. Directional trueness is maintained by retainers of standard bronze or "Rollube" ferrous alloy of one piece or two piece construction.

You may wish to refer to the Rollway Catalog and Engineering Data Book when writing specifications for a high precision bearing. It contains the first listing, by any manufacturer, of the thrust capacities of cylindrical radial roller bearings. Send for it today.

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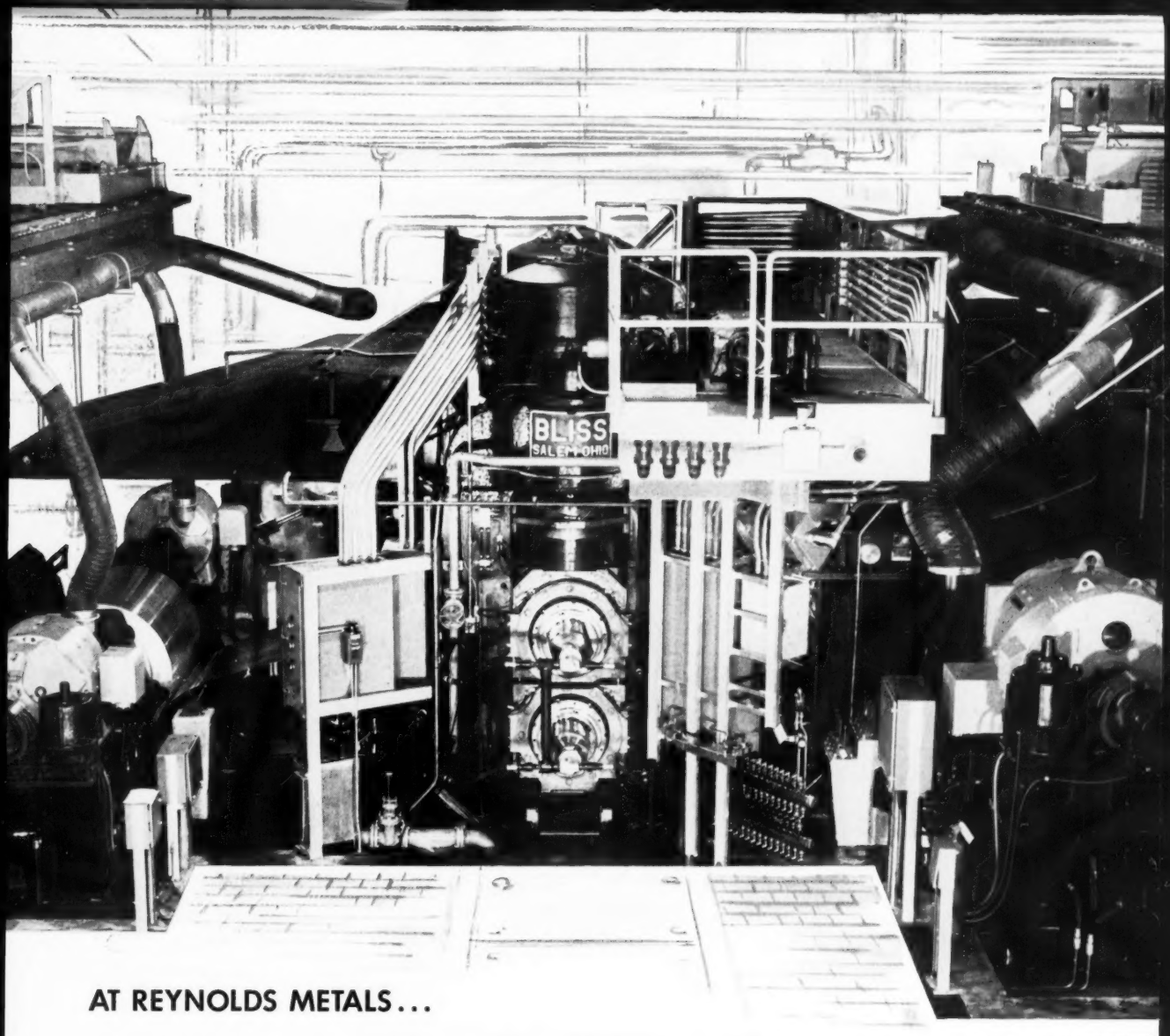

AT REYNOLDS METALS...

Unusual new Bliss mill helps meet growing demand for bright aluminum strip

First of its kind to be installed by Reynolds Metals Company for sheet operations, this new Bliss two-high cold reduction mill recently went into operation at Reynolds' Alloys Plant, near Sheffield, Ala.

A 66-inch mill capable of speeds up to 1000 fpm and reductions as high as 50%, the new mill has been especially designed for rolling bright aluminum strip, now being used in increasing quantities for both decorative and structural applications by the automotive, aeronautical, trailer and other industries.

Among the unusual design features built into the mill by Bliss' Rolling Mill Division are a continuous line flow coolant filtration system and a special heating arrangement that maintains the proper shape of the rolls. Electronic controls provide gage consistency in high speed acceleration and deceleration, as well as permitting the operator to detect difficulties at any point in the rolling operation from his position at the control panel.

According to Reynolds Metals, the new Bliss mill is part of a $65,000,000 expansion and modernization program now going on at the Alloys Plant.

For more examples of Bliss rolling mill and accessory equipment currently in use in both ferrous and nonferrous rolling plants, write us today for your complimentary copy of our new 84-page Rolling Mill Brochure, Bulletin 40-B.

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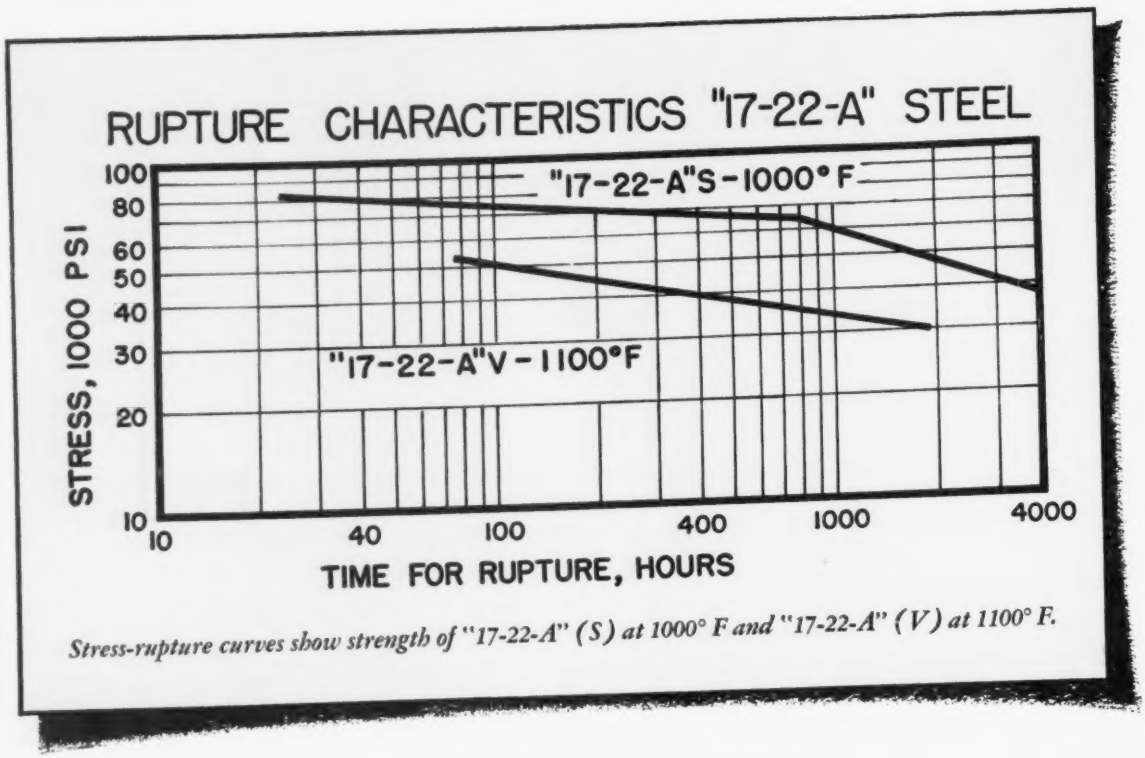
Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio



Stress-rupture curves show strength of "17-22-A" (S) at 1000° F and "17-22-A" (V) at 1100° F.

How to solve high temperature parts problems with low alloy steels

HERE'S how you can solve the problem of using expensive, high alloy steels for missile engine parts, airplane brakes, gas turbines or other units that must operate at high temperatures. You can use the Timken Company's *low* alloy "17-22-A"® steels. They contain less than 3% alloy. Yet they give *high* alloy performance—with maximum strength up to 1100° F. You save strategic alloys, cut your costs.

And that's not all you gain. Timken "17-22-A" steels have high resistance to heat checking and thermal cracking. They are readily workable up to 2300° F., are easily machined and welded. Maximum high temperature properties can be developed by normalizing and tempering, minimizing the possibility of distortion and quench cracking.

Get full details about "17-22-A"(S) steel, and its companion analysis, "17-22-A"(V), recommended for temperatures up to 1100° F. Send for Technical Bulletin 36B. And let our technical staff help you, as they've helped others, solve high temperature steel problems. Write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

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